

Proceedings of the American Academy of Arts and Sciences

VOL. 73, No. 10, P. 271-310—MAY, 1940

---

THE OLD WORLD SPECIES OF THE CELASTRACEOUS GENUS  
MICROTROPIS WALLICH

BY E. D. MERRILL AND F. L. FREEMAN

be  
pl  
pl  
M  
th  
is  
ce  
al  
th  
co  
to  
sic  
ha  
th  
re  
er  
In  
su  
Co  
gr  
if  
a  
po  
fo  
m  
he  
m  
hi  
th  
sp  
siz

see  
pa  
no  
ac  
alt  
va  
de  
su  
of  
pla

## THE OLD WORLD SPECIES OF THE CELASTRACEOUS GENUS MICROTROPIS WALLICH

By E. D. MERRILL AND F. L. FREEMAN

Received: March 6, 1939

Presented: April 10, 1940

Up to the end of 1938 forty-four binomials had been published under *Microtropis* Wallich, approximately ten of which, in accordance with the present study, appertain to genera other than *Microtropis*, or are synonyms of other species of the genus as we at present understand them. It is significant that up to the close of the last century but eighteen of these had been published, all but one appertaining to Old World species, the distinctly large increase in proposed species coming within the present century. At least up to a couple of decades ago the genus was considered to be a small one. No previous attempt has been made to consider, at one time, other than the relatively few species that occur in restricted areas covered by published floras or enumerations, such as those appertaining to India, Ceylon, Burma, Siam, the Malay Peninsula, Indo-China, Japan, the Philippines, and Central America and Mexico. A study of the group was undertaken under the impression that if one assembled the necessary historical material a considerable number of reductions might be possible. This idea has proved to be erroneous, for in connection with a rather intensive study of much or all the material in fourteen different herbaria, while a very few reductions have been made, a considerable number of apparently hitherto undescribed species have been detected, the net result being to increase the Old World species from about forty recognized in 1938 to sixty-four.

The status of the accepted generic name has seemed to us to be worthy of some consideration, partly because of the fact that the earlier leguminous genus *Microtropis* E. Meyer (Nov. 1835) actually invalidates *Microtropis* Wallich, which, although proposed in 1830, was not actually validated by the publication of a technical generic description until 1837, when a description was supplied by Meisner. Because of the general use of *Microtropis* Wallich for this particular group of plants since 1837, and because *Microtropis* E.

Meyer (Nov. 1835) is actually a synonym of *Euchlora* Ecklon & Zeyher (Dec. 1835), we believe, with Mansfeld, Repert. Sp. Nov. 39: 37. 1935, that *Microtropis* Wallich (1830-37) should be conserved against *Microtropis* E. Meyer (1835), although three other valid generic names are now available for the celastraceous genus with which we are concerned in *Paracelastrus* Miquel (1859), *Othrodendron* Makino (1909), and *Chingithamnus* Handel-Mazzetti (1932). Even although the genus *Microtropis* Wallich contains no species known to be of economic or horticultural importance we scarcely feel justified in advocating its abandonment and in the acceptance of *Paracelastrus* Miquel in its place under existing circumstances.

Under *Microtropis*, Wallich, List, p. 152. 1830, proposed the following binomials: *M. discolor* Wall., *M. ? coriacea* Wall., *M. longifolia* Wall., and *M. ? bivalvis* Wall. The first was based on *Cassine discolor* Wall. (1824) and the last on *Celastrus ? bivalvis* Jack (1820). *Microtropis ? coriacea* Wall. is apparently a synonym of *Salacia flavescens* Kurz (1872) of the Hippocretaceae. *Microtropis longifolia* Wall. remained a *nomen nudum* until 1873 when Kurz published a technical description of it.

In 1837, Meisner, Pl. Vasc. Gen. Tabl. Diagn. 69, Comment. 49. 1837, published the first technical description of *Microtropis* Wallich, based on *M. discolor* Wall. and *M. bivalvis* Wall. As no flowers of the latter were available, we unhesitatingly accept *M. discolor* Wall. as the type or standard species of the genus. Arnott published a more amplified generic description two years later, Ann. Nat. Hist. 3: 151. 1839. We call special attention to the fact that *Microtropis* Wallich as typified by *M. discolor* Wall. presents certain characters that do not hold for the majority of the species now placed in that genus. These are the absence of the disk, the short filaments alternating with the petals and slightly uniting their bases, the petals carinate

inside, and the fruits distinctly subfurfuraceous-lepidotulate. If one wished to segregate genera here, one could restrict *Microtropis* Wallich to a very few species, among those now known, and adopt *Paracelastrus* Miquel for the majority of the species in which the disk is distinctly developed; or if one wished to restrict *Paracelastrus* Miquel to the group that we have designated as *Filiformes*, then *Otherodendron* Makino and *Chingithamnus* Handel-Mazzetti would be available for other groups, the former for those species with peduncled cymes, and the latter for those with sessile lateral fascicles or glomerules.

*Paracelastrus* Miquel, Fl. Ind. Bat. 1 (2): 591. 1859, which is a synonym of *Microtropis* Wallich, as we have interpreted the latter genus, has had a somewhat peculiar history. King, Jour. As. Soc. Bengal 65 (2): 342. 1896 (Mater. Fl. Malay. Penin. 2: 628) definitely states that the plant issued by Wallich as *Microtropis* ? *bivalvis* Wall. is not, as Wallich supposed, the one described in 1820 as *Celastrus* ? *bivalvis* Jack, because Jack indicated his plant as apetalous. It was for the latter reason that Miquel in 1859 proposed the new generic name *Paracelastrus*, based wholly on Jack's original description of *Celastrus* ? *bivalvis*. King thought that *Euonymus capillaceus* Wall. might be the "lost" *Celastrus* ? *bivalvis* Jack.

As to whether or not Wallich 4340, representing *Microtropis* ? *bivalvis* Wall., actually represents *Celastrus* ? *bivalvis* Jack, it seems to us that this can best be judged by the following facts: Jack's original specimen was undoubtedly lost when his herbarium was destroyed by fire, February 2, 1824, while in transit on the "Fame" from Bencoolen, Sumatra to England. It had been collected by him on Prince of Wales Island = Penang. In a letter written from that place, March 9, 1819, he not only mentioned the species but stated that specimens of it were included in a parcel being forwarded to Wallich; and Wallich 4340 (Wallich List p. 152), issued as *Microtropis* ? *bivalvis* Wall. consists of two Penang collections, "G. Porter" and "Guilielm. Jack." Wallich cites *Celastrus bivalvis* Jack as a synonym. Jack again mentions the species in a letter written in Bencoolen, Sumatra, September 19, 1920,<sup>1</sup> stating that he was then about to publish the species. Jack arrived in Bencoolen from Penang in July or August, 1819. It seems to us that Wallich 4340, consisting in part of Penang material

actually collected by Jack and sent by him to Wallich, is as close to the type collection for both *Celastrus* ? *bivalvis* Jack and *Microtropis* ? *bivalvis* Wall. as can now be determined. We therefore believe that the genus *Paracelastrus* Miquel, which was based wholly on *Celastrus* ? *bivalvis* Jack, is a synonym of *Microtropis* Wallich; at least as long as we are content to consider that *Microtropis bivalvis* Wall. is congeneric with *Microtropis discolor* Wall. King's surmise that *Celastrus* ? *bivalvis* Jack was lost, and that Wallich 4340 did not represent the species does not appear to us to be justified from the record as given above. Undoubtedly Jack's statement that his *Celastrus* ? *bivalvis* was apetalous was due to the fact that he based his description on material from which the petals had fallen. The several sheets of Wallich 4340 that we have seen are all in fruit. We again call attention to the fact that *Paracelastrus* Miquel is characterized by the presence of a distinct disk, the stamens being borne on its margin, while *Microtropis* Wallich as typified by *M. discolor* Wall. has no trace of a disk, the filaments being attached near the bases of the petals and alternate with them.

The case of *Paracelastrus* is of further interest because in 1905, F. N. Williams, Bull. Herb. Boiss. II. 5: 224. 1905, in discussing *Celastrus bivalvis* Jack, did not accept King's conclusions and definitely accepted *Paracelastrus* as the proper generic name for the group that had hitherto passed as *Microtropis* Wallich, and transferred five additional binomials to *Paracelastrus*. These were overlooked by the compilers of the supplements to Index Kewensis until 1938, when they were included in Suppl. 9.

The second alternative generic name is *Otherodendron* Makino, Bot. Mag. Tokyo 23: 62. 1909, based on *Elaeodendron japonicum* Franch. & Sav. This was reduced to *Microtropis* Wallich by Hallier f., Meded. Rijks Herb. Leiden 1910: 33. 1911, and we see no valid reason for attempting to maintain it as a distinct genus or even as a subgenus or as a section. One could conceivably segregate from what we have included in *Microtropis* various minor categories, perhaps distinguishable by the number of ovary cells (1-celled or 2-celled), by certain inflorescence characters, or by disk characters, but intermediates as to cell and disk characters impress us as rendering such segregations of highly doubtful value. Thus if we bring together the few species that have no disk as opposed to the majority of the species in which the disk is well developed,

<sup>1</sup> Burkill, I. H. William Jack's letters to Nathaniel Wallich, 1818-21. Jour. Straits Branch Roy. As. Soc. 73: 147, 268. 1916.



the assemblage would be a very unnatural one made up of otherwise totally unrelated species. We are satisfied to include *Otherodendron* in the synonymy of *Microtropis* Wallich, although some Japanese botanists still recognize the former as a valid genus.

*Chingithamnus* Handel-Mazzetti, *Sinensia* 2: 128. 1932, the last generic name to be considered, is quickly disposed of. The genus was described as the basis of a new plant family, the Chingithamnaceae. The type, *Chingithamnus osmanthoides* Hand.-Maz., is clearly a *Microtropis*, as we have interpreted the latter genus, and is very closely allied to *Microtropis latifolia* Wight, differing only by certain more or less obscure characters. In the following year, *Sinensia* 3: 189. 1933, Handel-Mazzetti transferred the species to *Microtropis*, as *M. osmanthoides* Hand.-Maz.

The geographic distribution of *Microtropis* in the Old World is interesting in that there is not a single widely distributed species, that is, one even approaching the generic range of the group as a whole. As we have interpreted *Microtropis discolor* Wall., its range extends from Silhet, Bengal and Assam to Yunnan, occurring also in Burma, Siam and Indo-China, and very doubtfully in Penang; and in our present interpretation of its specific limits we have frankly treated this as a species *sensu latiore*. Doubtless future investigators, working with more abundant material, at least from the periphery of the range as given above, may find it possible and convenient to segregate certain forms either as varieties or as distinct species. This is very apt to be the case for the Penang and the Indo-China forms, still represented by inadequate material. The second rather widely distributed species is *Microtropis fokienensis* Dunn, with a range from Formosa, through southern China to Yunnan; and yet in this assemblage we are able to detect local forms distinguishable by minor but often rather intangible characters. Some of these forms may eventually be found to represent distinct categories, whether as species or as varieties. With the exception of these two species, all other forms are peculiarly restricted in geographic range, being confined to this or that part of this or that country, to this or that island, or even to single mountains as far as available collections indicate. Thus two species are confined to Ceylon, and others to southern peninsular India. Others are known only from restricted areas in India, Burma, Siam, Indo-

China, the Malay Peninsula, or from certain provinces or contiguous provinces in southern China. Still others are known only from single localities in Java, Borneo, Luzon, Catanduanes, Panay, and Basilan, and as to the Luzon species, the individual ones are generally known only from strictly restricted areas. The generic range in the Old World is from Silhet and Assam, southern peninsular India and Ceylon to central Japan and Formosa, southward through Burma, Siam, Indo-China, and the Malay Peninsula, to Sumatra, Java, Borneo, and the Philippines, in the latter group from northern Luzon to Basilan in the extreme south. No representative of the genus is known from Celebes, the Moluccas, the Lesser Sunda Islands or from the Papuan region. For restricted areas within the Old World range of the genus there are at present known eighteen species in China, including Hainan, nine in Burma, eight each for the Malay Peninsula (including Penang), Borneo, and the Philippines, five each for India and Indo-China, four in Siam, three each in Sumatra and in Japan-Formosa, two in Ceylon, and one in Java.

In such a group as this, where many of the recognized species are known only from single or very few collections, it is perhaps unwise to generalize on problems of geographic distribution. Yet in surveying the group as a whole, one is immediately impressed with the tremendously developed local endemism, which it is difficult to explain. As an illustration of how local or rare individual species may be, in all the field work that has been prosecuted in the botanically very well known island of Java in the past 200 years, *Microtropis* is represented in extant Javan botanical collections by only one species, based on a single collection, and Dr. S. H. Koorders, its collector, notes that it was very rare. In 1892 Haviland collected *Microtropis suborbiculata* Merr & Freem. on Mount Kinabalu, and this particular species still remains represented only by the type collection, although Mount Kinabalu has been intensively explored by a considerable number of collectors and botanists in the present century, and all of them ascended the mountain by the same route that Haviland followed. Yet these more recent explorers secured representatives of no less than four additional species of *Microtropis* on Mount Kinabalu, all very different from the one form that Haviland collected. In the twenty-one years that the senior author lived in the Philippines, from which group no less than eight species are now known, he never actually saw a

*Microtropis* in the field, although a total of several years was devoted to botanical exploration, including trips, at various times, into regions where the species are known to occur. Mr. A. D. E. Elmer's even more extensive field work from 1904 to date, in the Philippines, yielded but one species. All the Philippine species being small shrubs, they would not, if in flower or fruit, be consistently overlooked by any collector unless they were very rare or very local. Out of the total of sixty-four species considered in this paper no less than twenty are represented in the fourteen herbaria listed below by only single collections. We are impressed by the fact that the genus is not well represented in any large herbarium if we can judge by the material in the fourteen collections studied.

Within the tropics many of the species are confined to higher altitudes, this being true of all of the species of Java and Borneo, most of those in the Malay Peninsula, and most of the Philippine species. This is apparently true of the species of peninsular India and Ceylon, as well as perhaps most of those from Assam, Burma, Siam, Indo-China and Yunnan. Low or medium altitude species do occur in Sumatra, Penang, the Malay Peninsula, Burma, Philippines, Siam and Indo-China; and this is true of many of the species of southern China, Formosa, and Japan. Within the tropics all species are characteristically those of the primary forest areas, whether growing at low or higher altitudes. They are, without exception, small shrubs to small trees, and many of the species are described in the collector's notes as being only one or two meters high.

The study has been a difficult one, not only because of the inherent difficulties that one encounters in any large genus in such a group as the Celastraceae, but also because many of the extant specimens are inadequate. This is either because they were originally poorly prepared, or because of the absence of mature flowers or mature fruits. Perhaps the most striking case of this kind is *Microtropis borneensis* Merr. & Freem., somewhat inadequately described in this paper, although no less than 34 herbarium sheets representing it were available for study from Mount Kinabalu; the collectors failed, in all this material, to select really good specimens for every one of the numerous flowering specimens examined was either too young (immature buds only) or too old (petals and stamens fallen).

We have frankly not been able to propose a strictly natural arrangement of the sixty-four

recognized species, partly because of inadequate material, lacking mature flowers or mature fruits as the case may be, partly because of the apparent variability when one attempts to evaluate such characters as the number of floral parts, the number of ovary cells, presence or absence of a distinct disk, and the disk characters, such as its consistency, whether thin or thickened, truncate or lobed, prominent or obscure, and whether the stamens are attached to its edge (as is the case in most species), or just outside or inside its margin, or, as is the case with the type species of *Microtropis*, *M. discolor* Wall., where the disk is obsolete, the filaments being attached near the bases of the petals, slightly uniting and alternate with them. In most cases the filaments are borne on the edge of the strictly truncate disk, occasionally slightly outside or even slightly inside its margin, occasionally alternating with distinct lobes (*M. submembranacea* Merr. & Freem.). The disk is usually prominent, thin or thickened, but occasionally subobsolete or so obscure as to be difficult to detect. In a few species what may represent the disk is made up entirely of the fused basal portions of the filaments.

If one elects to utilize the presence or absence of the disk as a basis of generic segregation one immediately encounters difficulties. *Microtropis discolor* Wallich, the type of the genus, has no trace of a disk, and the closely allied *M. pallens* Pierre falls in the same category. Otherwise the entirely different *Microtropis Scottii* Parkinson, quite unlike any other species of the genus, and the equally different *M. tenuis* Symington and *M. valida* Ridley of the *Cymoso-paniculatae* series would fall together as a distinctly unnatural group merely because they have one character in common—no disk. If *Microtropis* were to be interpreted as having no disk, which is true of the type species, and the numerous other species having a distinct disk were transferred to *Paracelastrus*, *Otherodendron*, or *Chingithamnus*, then the logical procedure would be to set up a distinct genus to take *Microtropis Scottii* Parkinson, and another genus to take *Microtropis tenuis* Symington and *M. valida* Ridley, in spite of the fact that the actual congeners of the last two species have a distinct disk, the series *Cymoso-paniculatae*.

Most species have strictly 5-merous flowers, but in six species only 4-merous ones were observed. In *Microtropis Curranii* Merr., *M. fokiensis* Dunn, *M. obscurinervia* Merr. & Freem. and *M. Sakaguchiana* Koidz. 4- and 5-merous flowers were found, even on the same branchlet.

In *M. hexandra* Merr. & Freem. the stamens are usually six.

The number of ovary cells is often somewhat difficult to determine, partly because of the nature of some of the material available for study, partly because of the fact that in ten species only the fruits are known, and partly because, in some cases, the dividing wall may be only a partial one. Most of the species of which we have had adequate material have 2-celled ovaries, about fifteen have apparently 1-celled ovaries, and in about ten cases it has been impossible to determine this point. Three-celled ovaries have been credited to *Microtropis* by various authors, but none were observed in the numerous dissections made in the course of this study. We doubt if a 3-celled ovary is a proper character of *Microtropis*.

The fruit, although variable in shape and in size, seems to be reasonably constant in essential characters. The capsules may be merely apiculate, prominently rostrate or even long-beaked; small or relatively large; rather dry or somewhat fleshy. The pericarp may be longitudinally striate, smooth, or somewhat rugose, although it is usually glabrous, or in one species minutely subfurfuraceous-lepidotulate. Apparently all of them split down one side eventually exposing the solitary seed. Of about twenty species the fruits are still unknown.

The inflorescence is various. One series has strictly sessile axillary or lateral often many-flowered glomerules or fascicles, all flowers strictly sessile. In most cases the inflorescence is a strictly dichotomous cyme, forking regularly from one to several times, although at times it may be very greatly reduced. One apparently natural group is characterized by its paniculate-cymose inflorescences; i. e., the rachis is extended above the first pair of lateral branches, the few primary branches being racemosely arranged, the inflorescence hence essentially paniculate rather than dichotomous; but in two of the species placed in this group the disk is absent, although in the others it is well developed. As between those species with strictly sessile glomerules or fascicles and those with short- to long-peduncled dichotomous cymes, intermediates occur, it being sometimes rather difficult to determine whether a species should be placed in one category or in the other. Hence in the construction of the artificial key, we have in fourteen cases included the same species in two categories, and two cases in three categories. In some cases the cymes, still distinctly although shortly peduncled, may

be reduced to three, two, or in one case to a single flower.

The vegetative characters show great variation in the shape, consistency, and size of the strictly opposite entire leaves, varying from membranaceous to rigidly coriaceous, from sessile to prominently petioled, and in size from a few cm. in length to as much as 30 cm., and in width from less than 1 cm. to as much as 15 cm. The nerves and reticulations, usually slender, may be raised or not, and vary from very prominent to nearly obsolete. Essentially all species are glabrous, exceptions occurring in *Microtropis gracilipes* Merr. & Freem. and in *M. confertiflora* Merr. & Freem., of China, where the younger parts and inflorescences may have a very few, widely scattered, short, stiff hairs. The sepal margins may be entire, erose, lacerate, ciliate or even pectinate, but their central portions are always more or less thickened and the marginal parts much thinner. In some cases the dried leaves are distinctly but minutely verruculose, and in such species the nerves and reticulations may be obsolete or subobsolete. Very frequently the tips of the terete, sulcate, slightly compressed or sharply 4-angled young branchlets show a characteristic pair of small aciculiform bodies that we interpret as incipient leaves, although in at least one case these were erroneously described as stipules; the latter are entirely absent.

In spite of the diversity in vegetative, inflorescence, floral, and fruit characters, one is impressed with the apparent naturalness of the group as a whole by the fact that no matter what the condition of the material may be—whether in fruit, in flower, in young bud, or even sterile, or whether the specimens be low or high altitude forms from any part of the generic range, one seldom fails to recognize a specimen at sight as representing *Microtropis* once one is reasonably familiar with a small series of species. The individual species, although by no means always readily distinguishable from each other, are not easily confused with the representatives of any other genus.

Not being able to devise any logical separation of numerous forms into sharply defined categories that might be classified as subgenera or sections, we have been content to indicate a number of series, bringing together groups of species that have certain more or less obvious characters in common. We do not claim that these are always natural groups, although two, *Ramiflorae* and *Cymoso-paniculatae*, are rather sharply defined

and the indicated characters hold very closely. Some of the proposed series are admittedly highly artificial. Doubtless when good flowers and mature fruits of all the species are known, some more logical sequence and relationship of the various groups can be devised; but then doubtless many of the series herein proposed will be broken down and the species redistributed.

When this study was commenced it was intended to consider the few American species of the genus. Later it was learned that Dr. C. L. Lundell, of the University of Michigan, had assembled the available American material of *Microtropis*, with view to studying it. We accordingly submitted the small amount of New World material available to us to him for identification, and at the end of this paper merely list the known and excluded American species as a matter of record. As far as we have been able to determine, in spite of the discontinuous generic distribution, the few American species (other than those excluded from *Microtropis*) are congeneric with the Old World species as we have interpreted the genus, and in this respect Dr. Lundell is in agreement, after studying flowers representing a wide range of Old World forms. One may be at loss to explain the reasons for such wide gaps in continuous distribution as between the Indo-Malaysian and eastern Asiatic regions on the one hand and Mexico and Central America on the other hand, yet it seems to be an established fact that such discontinuous distributions do occur in a number of unrelated families such as the Juglandaceae, Araliaceae, and others. In any case the center of origin and distribution for *Microtropis* seems safely to be southern Asia if we may judge by the number and diversity of the species concerned.

This study has been prosecuted at the Arnold Arboretum at intervals during the past two years. It was based essentially on the material in the herbarium of the Arnold Arboretum, supplemented by important loans from a number of large herbaria in the United States, Europe and Asia, in most cases all available material being courteously loaned by the administrative officials. The abbreviations cited in the text are as follows, each indicating the particular herbarium involved:

- A. Arnold Arboretum of Harvard University.
- B. Botanical Gardens, Buitenzorg, Java.
- C. Royal Botanic Gardens, Calcutta, India.
- Ge. Jardin botanique, Geneva, Switzerland (includes material from the Garden Herbarium,

de Candolle Herbarium, Boissier Herbarium, and Delessert Herbarium).

- Gr. Gray Herbarium of Harvard University.
- K. Royal Botanic Gardens, Kew, England.
- L. Rijks Herbarium, Leiden, the Netherlands.
- M. Philippine Bureau of Science, Manila, Philippines.
- N. New York Botanical Garden, New York.
- P. Principal Botanic Garden, Leningrad, U. S. S. R.
- S. Botanic Garden, Singapore, Straits Settlements.
- Su. Sun Yatsen University, Canton, China.
- U. United States National Herbarium, Washington, D. C.
- U.C. University of California Herbarium, Berkeley, California.

In addition to this courteously loaned material, which has given us actual access to practically every extant type, or at least to practically every type collection, we are under obligations to Dr. R. Kanehira, Kyushu Imperial University, Fukuoka, Dr. T. Nakai, Tokyo Imperial University, Dr. G. Koidzumi of the Kyoto Imperial University, Japan, and to Sir Arthur Hill, Director of the Royal Botanic Gardens, Kew, England, for critical notes, photographs of historical material, and other data. We wish to express our sincere appreciation to all concerned who have thus placed at our disposal, important material without which this study, with such imperfections as it undoubtedly contains, would have been impossible. All species are represented in the Herbarium of the Arnold Arboretum, if not by actual specimens, then by photographs of types and other historical material.

**Microtropis** Wallich, List 152, no. 4337-40. 1830, *nomen nudum*; Meisn. Pl. Vasc. Gen. Tabl. Diagn. 68. 1837, Comment. 49. 1837, *descr.*; Arnott, Ann. Mag. Nat. Hist. 3: 151. 1839; Endl. Gen. Pl. 1087. 1841; Walp. Repert. 1: 534. 1842; Lindl. Veg. Kingd. 588. 1847; Benth. & Hook. f. Gen. Pl. 1: 361. 1862; Laws. in Hook. f. Fl. Brit. Ind. 1: 613. 1875; Kurz, For. Fl. Brit. Burma 1: 250. 1877; Loesen. in Engl. & Prantl, Nat. Pflanzenfam. 3 (5): 202. 1892; Trimen, Fl. Ceyl. 1: 268. 1893; King, Jour. As. Soc. Bengal 65 (2): 340. 1896 (Mater. Fl. Malay. Penin. 2: 626); Cooke, Fl. Bombay Presid. 1: 229. 1902; Pitard in Lecomte, Fl. Gén. Indo-Chine 1: 879. 1912; Gamble, Fl. Presid. Madras 1: 205. 1918; Ridl. Fl. Malay



Penin. 1: 443. 1922; Makino & Nemoto, Fl. Jap. ed. 2, 685. 1931; Lemée, Dict. Gen. Pl. Phan. 4: 474. 1932; Kanj. & Das, Fl. Assam 1: 267. 1937.

*Paracelastrus* Miq. Fl. Ind. Bat. 1 (2): 590. 1859; F. N. Williams, Bull. Herb. Boiss. II. 5: 224. 1905.

*Otherodendron* Makino, Bot. Mag. Tokyo 23: 60, fig. 1909; Makino & Tanaka, Man. Fl. Jap. 330. 1927; Makino & Nemoto, Fl. Jap. ed. 2, 686. 1931.

*Chingithamnus* Hand.-Maz. Sinensia 2: 128, fig. 1932 (Chingithamnaceae, p. 126).

Because of the numerous technical descriptions of *Microtropis* that have been published it seems unnecessary or undesirable that a complete generic description be included in this paper, as it would merely repeat what is already known regarding the general characters of the group. As noted above we have been content to accept *Microtropis* Wallich as it has been interpreted by our numerous predecessors, and have not attempted to establish generic segregates or even subgenera. Variations in reference to the number of floral parts and ovary cells, inflorescences, absence or presence of the disk, and the disk characters, are briefly discussed above. We repeat that we have found no 3-celled ovaries in the material examined (a character that has been accredited to the genus by some authors), and that in one species 6-merous flowers were observed. In several species 4-merous and 5-merous flowers occur sometimes on the same specimen.

In the preparation of the following strictly artificial key we have utilized, for the most part, more or less obvious characters. It is probable that better results might have been attained for practical purposes of identification, had we elected to prepare a series of geographic keys, as Loesener<sup>1</sup> did, in part, in his treatment of the Aquifoliaceae, or as Sleumer<sup>2</sup> more recently did in his treatment of *Hydnocarpus*. For practical purposes of identification genera of the general type of *Ilex*, *Hydnocarpus*, and *Microtropis*, where the majority of the species are of strictly limited geographic distribution, geographic keys are often distinctly practicable. With *Micro-*

*tropis* it would be a relatively simple matter to construct keys to the species of limited geographic areas, such as those of India, Burma, the Malaysian region, China, or the Philippines, with perhaps less duplication of entries than occurs in the following artificial key, for the reason that most of the known species of the genus are strictly local.

#### ARTIFICIAL KEY TO THE SPECIES

1. Flowers in lateral, rarely terminal, sessile glomerules or fascicles.
2. Leaves obtuse, rounded, or sometimes slightly retuse, never acuminate.
3. Leaves 6-8 cm. long (India).....1. *M. ramiflora*.
3. Leaves 2-5 cm. long.
4. Leaves oblong or elliptic, slightly rugose on the upper surface when dry (Ceylon)
  2. *M. zeylanica*.
4. Leaves broadly elliptic to suborbicular, the upper surface smooth (Borneo)
  3. *M. suborbiculata*.
2. Leaves more or less acuminate or at least acute.
3. Leaves three or more times as long as broad.
4. Leaves 20-30 cm. long; fascicles cauline or on the larger branches below the leaves (Philippines).....53. *M. fasciculata*.
4. Leaves not exceeding 20 cm. in length, mostly 6-15 cm. long; fascicles axillary or terminal.
5. Leaves verruculose; nerves obscure; reticulations obsolete or nearly so; leaves pale when dry (Hainan).....7. *M. obscurinervis*.
5. Leaves not verruculose; nerves distinct; reticulations evident, mostly more or less raised on one or both surfaces and often rather close.
6. Leaves 15-20 cm. long, lower surface pale brown in strong contrast to the darker upper surface; inflorescences terminal (Borneo)
  40. *M. bicolor*.
6. Leaves 7-15 cm. long, under surface usually paler than the upper one but not in striking contrast to it; inflorescences lateral.
7. Inflorescences 2-flowered; leaves rather slenderly acuminate (Kwangtung) 18. *M. biflora*.
7. Inflorescences more than 2-flowered; leaves acute to very shortly acuminate (Ceylon)
  4. *M. Wallichiana*.
3. Leaves mostly less than three times as long as broad.
4. Leaves verruculose on the upper surface when dry.
5. Flowers 4-merous (Yunnan) 10. *M. sessiliflora*.
5. Flowers 5-merous.
6. Leaves verruculose only on the upper surface, the nerves and reticulations distinct on the lower surface (India).....5. *M. Stocksii*.
6. Leaves verruculose on both surfaces; nerves obscure.

<sup>1</sup>Loesener, T. Monographia Aquifoliacearum. Nov. Act. Acad. Caes. Leopold.-Carol. Nat. Cur. 78: i-viii. 1-598. t. 1-15. 1901; II. 89: 1-313. 1908.

<sup>2</sup>Sleumer, H. Monographie der Gattung *Hydnocarpus*. Bot. Jahrb. 69: 1-94. t. 1-4. 1938.

7. Leaf base broadly acute, rounded, or narrowly rounded-subtruncate; petioles not exceeding 5 mm. in length (Kwangsi)
  9. *M. osmanthoides*.
7. Leaf base cuneate to decurrent-acuminate; petioles 0.5–1.5 cm. long.
8. Leaves elliptic to oblanceolate, 10–20 x 3–8 cm.; sepals fimbriate; fascicles few-flowered (Hainan).....7. *M. obscurinervia*.
8. Leaves oblong-elliptic, 4–8 x 1.5–4 cm.; sepals entire; fascicles few-flowered (Siam)
  6. *M. crassifolia*.
8. Leaves elliptic to ovate, 8–17 x 3–12 cm.; sepals erose, not fimbriate; fascicles many-flowered (India).....8. *M. latifolia*.
4. Leaves mostly smooth, or at least not verruculose when dry, the ultimate reticulations often more or less raised.
5. Flowers 3–4 mm. long, the petals about 3 mm. long.
6. Leaves 5–10 cm. long, elliptic, oblong-elliptic, or broadly oblong-lanceolate.
7. Leaves subacuminate, the secondary nerves faint, scarcely evident; fascicles few- (2–3) flowered.
8. Leaves thickly coriaceous, subacuminate, brownish olivaceous on the lower surface when dry; nerves obscure on the upper surface (Malay Peninsula)
  37. *M. ophirensis*.
8. Leaves chartaceous, sharply acuminate, the lower surface pale when dry, the nerves slender, somewhat elevated on both surfaces; inflorescences strictly 2-flowered (Kwangtung).....18. *M. biflora*.
7. Leaves subacute to obtuse, not acuminate; secondary nerves forming a conspicuous reticulum; cymes compact, subsessile, 3–8-flowered (Kwangtung-Lantau Island)
  12. *M. reticulata*.
6. Leaves 8–15 cm. long, ovate to elliptic, mostly subabruptly and rather slenderly acuminate (Malay Peninsula, Sumatra)
  35. *M. elliptica*.
5. Flowers 1.5–2.5 mm. long; leaves subacute to acuminate; primary nerves 8–12 pairs, slender but distinct, spreading (Ceylon)
  4. *M. Wallichiana*.
1. Flowers in short- or long-peduncled, solitary or fascicled, few- to many-flowered (in a few cases the peduncles 1- or 2-flowered only), axillary or terminal, dichotomous cymes, or in cyme-like panicles, sometimes subcapitate-glomerate, but when so the short peduncles evident.
2. Leaves subsessile or with very short stout petioles, the bases very broadly rounded to abruptly obtuse, texture always rigidly coriaceous.
3. Leaves 6–12 cm. long; flowers not glomerate-capitate.
4. Leaves ovate, the base very broadly rounded; cymes up to 1 cm. long (Borneo) 39. *M. ovata*.
4. Leaves elliptic to oblong-elliptic, distinctly narrowed below to the abruptly obtuse, slightly rounded, or even slightly cordate base (Borneo)
  38. *M. rigida*.
3. Leaves 2–5.5 cm. long; flowers in short-peduncled capitate glomerules (Ceylon) 2. *M. zeylanica*.
2. Leaves distinctly petioled, the base cuneate, acute, or decurrent-acuminate, very rarely rounded; texture various.
3. Inflorescences paniculate-cymose; i. e., the rachis normally produced above the first pair of lateral branches, the few primary branches racemously arranged.
4. Inflorescences 5 to 6 times as long as the petioles (Malay Peninsula).....58. *M. valida*.
4. Inflorescences not more than twice, or rarely three times, as long as the petioles.
5. Leaves 5–9 x 2–4 cm., membranaceous or thinly chartaceous; disk none or very obscure (Malay Peninsula).....57. *M. tenuis*.
5. Leaves much larger, mostly 10–22 x 4–12 cm.; disk evident, truncate.
6. Leaves rigidly and thickly coriaceous, the lateral nerves rather distinct above, obscure on the very pale, almost subverruculose lower surface (Borneo)
  60. *M. sterrophylla*.
6. Leaves chartaceous to coriaceous (but not rigidly so), the lateral nerves fairly distinct on both surfaces.
7. Branchlets slender, about 1 mm. in diameter, prominently sulcate; leaves thinly chartaceous or the younger ones submembranaceous (Philippines)....62. *M. basilanensis*.
7. Branchlets rather stout, mostly 1.5–3 mm. in diameter, terete or at most slightly compressed, rarely somewhat sulcate; leaves chartaceous to coriaceous.
8. Leaves 3–4 times as long as broad.
9. Fruits about 2 cm. long, narrowed upward to the more or less rostrate apex; reticulations lax (Philippines) 63. *M. rostrata*.
9. Fruits about 1 cm. long, reticulations close (Borneo).....59a. *M. kinabaluensis* var. *acuminata*.
8. Leaves less than 3 times as long as broad.
9. Leaves rather thinly chartaceous (Philippines).....61. *M. rubra*.
9. Leaves coriaceous or firmly chartaceous.
10. Leaves pale in the lower surface; fruits unknown (probably about 1 cm. long) (Borneo).....59. *M. kinabaluensis*.
10. Leaves brown or brownish beneath; fruits 1.5–2 cm. long (Philippines)
  64. *M. platyphylla*.
3. Inflorescences normally of strictly dichotomous cymes, the rachis never produced above the

- first fork, simple, rarely 1- or 2-flowered, once to several times dichotomously branched, sometimes greatly reduced and almost fascicle-like; flowers few to many; peduncles very short to greatly elongated.
4. Leaves 16-30 cm. long (in some forms with smaller ones 12-15 cm. long on the same branches with the larger ones).
  5. Leaves verruculose when dry (Burma).  
44. *M. macrophylla*.
  5. Leaves not verruculose.
  6. Fruit oblong-ovoid, abruptly long caudate or stoutly rostrate.
  7. Fruits abruptly long-caudate, the slender beak about 1 cm. long (Malay Peninsula)  
51. *M. longirostris*
  7. Fruit tapering more or less gradually into a stout beak 5 mm. long or less (Philippines)  
52. *M. chartacea*.
  6. Fruits (where known) subglobose, oblong, ovoid or obovoid, at most merely short-apiculate, not rostrate.
  7. Cymes at anthesis less than 1 cm. long, including the short peduncle, at most once-branched; flowers few (Sumatra)  
54. *M. pauciflora*.
  7. Cymes at anthesis much larger, often long-peduncled, several times branched, usually many-flowered.
  8. Peduncles stout, axillary, at most 2.5 cm. long, frequently much shorter; leaves chartaceous, usually elliptic; nerves 9-12 pairs (Sumatra).....55. *M. sumatrana*.
  8. Peduncles slender, mostly terminal, about 3 cm. long; leaves oblong, mostly membranaceous; lateral nerves about 8 pairs (Malay Peninsula).....46. *M. peduncularis*.
  8. Peduncles mostly lateral, slender, often filiform, mostly 3.5-8 cm. long; leaves oblong to oblong-elliptic; lateral nerves about 12 pairs; cymes usually lax, open.
  9. Flowers small, about 3 mm. long; peduncles 4-8 cm. long (Malay Peninsula)  
45. *M. filiformis*.
  9. Flowers relatively large, 4.5-5 mm. long; peduncles 3-4.5 cm. long (Burma)  
45a. *M. filiformis*.  
var. *grandiflora*.
  4. Leaves normally less than 15 cm. long.
  5. Leaves mostly not more than twice as long as wide.
  6. Inflorescence at anthesis normally not exceeding the petioles in length.
  7. Leaves verruculose when dry, coriaceous.
  8. Leaves 1.5-4 cm. wide; lateral nerves about 8 pairs, obsolete or nearly so on the lower surface (Siam).....6. *M. crassifolia*.
  8. Leaves 4-8 cm. wide; lateral nerves 4-5 pairs, more or less evident on the lower surface (Burma).....43. *M. longifolia*.
  7. Leaves never verruculose when dry, texture various.
  8. Leaves at most chartaceous.
  9. Leaves caudate-acuminate, their petioles 1-1.5 cm. long (Java).....33. *M. javanica*.
  9. Leaves bluntly or acutely acuminate, not caudate, their petioles less than 1 cm. long.
  10. Leaves very broadly, obtusely, and bluntly acuminate, or merely obtuse, subglaucous beneath, nerves very prominent (Burma)....41. *M. Gagei*.
  10. Leaves acutely acuminate.
  11. Lateral nerves very slender, acumen very short (Formosa)  
25. *M. micrantha*.
  11. Lateral nerves conspicuous beneath, the usually rather slender acumen about 1 cm. long (Malay Peninsula, Sumatra).....35. *M. elliptica*.
  11. Leaves rigidly and thickly coriaceous, very abruptly short-acuminate (Borneo).....36. *M. borneensis*.
  8. Leaves coriaceous.
  9. Leaves obtuse or rounded; lateral nerves about 5 pairs (Hongkong, Hainan, Kwangsi).....11. *M. paucinervia*.
  9. Leaves more or less acuminate; nerves 6-8 pairs.
  10. Leaf-tips usually glandular-indurated (Philippines).....16b. *M. Curranii*  
var. *zambalesensis*.
  10. Leaf-tips not glandular-indurated (Kwangtung, Kwangsi)  
13. *M. cathayensis*.
  6. Inflorescences at anthesis distinctly longer than the petioles.
  7. Inflorescences several times longer than the petioles.
  8. Leaves coriaceous, obtuse (India)  
15. *M. microcarpa*.
  8. Leaves thinly chartaceous, acuminate (Burma).....47a. *M. bivalvis* var. *laeta*.
  7. Inflorescences normally more than one and one-half to two times as long as the petioles, their peduncles 5-10 mm. long.
  8. Leaves chartaceous or submembranaceous, 1.5-2 cm. wide, green on both surfaces when dry; fruits merely apiculate; disk distinctly lobed (Hainan, Kwangtung)  
26. *M. submembranacea*.
  8. Leaves coriaceous; disk truncate.
  9. Leaves mostly rounded or obtuse, rarely somewhat narrowed to the short, broad, and obtuse acumen which is never glandular-indurated; nerves ascending (Japan, Riu Kiu, Formosa)  
31. *M. japonica*.
  9. Leaves more or less acuminate or merely acute, often abruptly and bluntly short-

- apiculate, the tip dark colored or black, glandular-indurated; nerves in general spreading (Philippines) 16. *M. Curranii*.
5. Leaves normally more than twice as long as wide.
6. Leaves obtuse, rounded, or slightly retuse (India).....15. *M. microcarpa*.
6. Leaves acute or acuminate.
7. Peduncles 1-8 cm. long.
8. Leaves verruculose when dry; nerves obscure (Burma).....42. *M. pachyphylla*.
8. Leaves not verruculose when dry, mostly smooth; nerves visible at least on the lower surface.
9. Cymes open, mostly lax, 4-10 cm. long, their peduncles very slender, greatly elongated.
10. Cymes very open, few-flowered; primary and secondary branches slender, elongated, one very large sessile flower with reflexed petals in each fork, the ultimate branches with one sessile and two slenderly long-pedicelled flowers (Burma).....48. *M. Scottii*.
10. Cymes with numerous flowers on the ultimate branches, these usually crowded, all pedicels very short; petals never reflexed.
11. Flowers small, about 3 mm. long.
12. Leaves mostly 11-20 cm. long; lateral nerves 9-11 pairs; peduncles 4-8 cm. long (Malay Peninsula, Sumatra).....45. *M. filiformis*.
12. Leaves 8-11 cm. long; lateral nerves about 7 pairs; peduncles 2-5 cm. long (Burma).....47a. *M. bivalvis* var. *laeta*.
11. Flowers relatively large, 4.5-5 mm. long (Burma).....45a. *M. filiformis* var. *grandiflora*.
9. Cymes various, mostly not exceeding 3 cm. in length, or if longer than this, then the flowers usually subcapitately crowded.
10. Leaves rigidly coriaceous, 4-8 cm. long (Malay Peninsula) .37. *M. ophirensis*.
10. Leaves submembranaceous, chartaceous, or at most subcoriaceous, never rigidly coriaceous.
11. Cymes 3-flowered.
12. Leaves 13-15 x 3.5-5 cm. (Yunnan) 20. *M. Henryi*.
12. Leaves 8-13 x 2-4 cm. (Penang) 47. *M. bivalvis*.
12. Leaves 6-9 x 1.5-2 cm. (Szechuan) 19. *M. triflora*.
11. Cymes more than 3-flowered.
12. Cymes very lax, few- (not more than 5) flowered (Penang) 47. *M. bivalvis*.
12. Cymes rather dense, or if somewhat lax or open, then more than 5-flowered.
13. Flowers subcapitately crowded, the heads 1-2 cm. in diameter, the flowers 4.5-5 mm. long (Kwangtung, Kwangsi) 50. *M. confertiflora*.
13. Flowers not subcapitately crowded, not more than 3.5 mm. long, or if subcapitate the cymes 1 cm. in diameter or less.
14. Cymes less than 1 cm. in diameter, few-flowered, the peduncles slender, 1.5-3 cm. long (Kwangtung) 49. *M. gracilipes*.
14. Cymes open, rather lax, usually branched 3-4 times, 3-5 cm. in diameter.
15. Leaves mostly 9-16 x 4-7.5 cm.; fruits 2 cm. long; disk united to the petals; anthers about 1.3 mm. long (Indo-China) 34. *M. fallax*.
15. Leaves mostly 8-13 x 2.5-5 cm.; fruits 1.5 cm. long or less; disk free, truncate, the filaments attached just below its margin on the back; anthers less than 0.5 mm. long (Indo-China, Yunnan, Kwangsi).....27. *M. Petelotii*.
6. Peduncles less than 1 cm. long.
7. Peduncles 1-flowered (Yunnan) 17. *M. oligantha*.
7. Peduncles 2- to many-flowered.
8. Leaves coriaceous.
9. Leaves verruculose when dry, pale; nerves obsolete or subobsolete (Siam) 6. *M. crassifolia*.
9. Leaves not verruculose when dry, smooth or at least with more or less raised reticulations; nerves in general distinct on one or both surfaces.
10. Leaves in general obtuse or rounded, and usually pale when dry.
11. Lateral nerves 8-10 pairs (Kwangtung-Lantao Isld.).....12. *M. reticulata*.
11. Lateral nerves 4-5 pairs at most.
12. Leaves oblong-oblancoolate, 2.5-5 x 0.5-1.5 cm.; flowers small (Riukiu) 32. *M. Sakaguchiana*.
12. Leaves in general elliptic-obovate, to oblong-obovate to subovate, 3.5-9 x 1.5-5 cm.; flowers large (Japan, Riukiu, Formosa) .31. *M. japonica*.
10. Leaves more or less sharply acuminate, caudate-acuminate, or merely acute.
11. Nerves not distinctly raised on the upper surface, the reticulations there obsolete or subobsolete.



12. Leaves 4-8 x 1.5-3 cm., gradually short-acuminate, dark-olivaceous on both surfaces when dry (Malay Peninsula).....37. *M. ophirensis*.
12. Leaves 6-13 x 3-5 cm., abruptly short-acuminate, the lower surface castaneous when dry (Borneo)  
36. *M. borneensis*.
11. Nerves and reticulations distinctly raised on both surfaces when dry.
12. Leaves slenderly subcaudate-acuminate, 10-13 cm. long; cymes 3-flowered (Kwangtung)  
14. *M. obliquinervia*.
12. Leaves shortly acuminate, 5-11 cm. long; cymes mostly many-flowered (Kwangsi, Kwangtung)  
13. *M. cathayensis*.
8. Leaves chartaceous or submembranaceous.
9. Peduncles very short, 2-flowered (Kwangtung).....18. *M. biflora*.
9. Peduncles more than 2-flowered.
10. Flowers 4- or 5-merous.
11. Nerves curved-anastomosing very close to the margin (Burma) 41. *M. Gagei*.
11. Nerves arched-anastomosing rather distant from the margin.
12. Lateral nerves 3-4 pairs only, sharply ascending; leaves caudate-acuminate (Burma)....21. *M. Beddomei*.
12. Lateral nerves 5 or more pairs, spreading or ascending; leaves more or less acuminate, sometimes caudate or subcaudate.
13. Branchlets sharply 4-angled, or very prominently sulcate-angled.
14. Nerves spreading; leaves oblong-ovate to oblong-elliptic; cymes rather open, lax.
15. Leaves 9-12 x 3.5-5 cm. (Kwangsi).....24. *M. tetragona*.
15. Leaves 3.5-8 x 1.5-3 cm.; disk distinctly lobed (Hainan, Kwangtung)  
26. *M. submembranacea*.
14. Nerves in general ascending; leaves mostly lanceolate; cymes dense; internodes short (1-2.5 cm.) (Formosa to Yunnan)  
28. *M. fokiensis*.
13. Branchlets terete, somewhat compressed or sulcate, rarely slightly angled.
14. Leaves in general lanceolate, mostly 1-3.5 cm. wide (Formosa to Yunnan)....28. *M. fokiensis*.
14. Leaves in general oblong to oblong-elliptic or oblong-obovate, mostly 2.5-6 cm. wide.
15. Primary nerves 9-11 pairs (Indo-China).....30. *M. pallens*.
15. Primary nerves about 7 pairs or less.
16. Fruits about 1.5 cm. long, prominently rostrate-acuminate (Philippines) 56. *M. philippinensis*
16. Fruits at most apiculate.
17. Fruits smooth, brownish olivaceous, the pericarp subglaucous, their pedicels smooth, 3-4 mm. long; leaves 13-15 x 3.5-5 cm.; nerves 5-6 pairs, very laxly and conspicuously arched-anastomosing, prominently raised on the lower surface (Yunnan)  
20. *M. Henryi*.
17. Fruits green, longitudinally striate, their very stout pedicels very rugose, at most 2 mm. long; leaves 6-10 x 2.5-4 cm.; nerves 7 pairs slightly raised; disk truncate (Indo-China)  
23. *M. chlorocarpa*.
17. Fruits grayish, sub-furfuraceous-lepidulote and very slightly rugulose, not longitudinally striate, the very stout pedicels usually very short; leaves variable in size, 7-15 x 2-6 cm. usually prominently caudate-acuminate; nerves 5-6 pairs; disk none (Sikkim, Assam, Burma, Siam, Indo-China, Yunnan, ?Penang)  
29. *M. discolor*.
11. Flowers 6-merous; leaves thin, 5-7 x 1.5-3 cm.; cymes 2-3-flowered (Yunnan).....22. *M. hexandra*.

Series RAMIFLORAE

Leaves mostly coriaceous, small or medium in size, the flowers all strictly sessile in often many flowered, sessile, axillary or extra-axillary glomerules or fascicles. Species of India, Ceylon, Burma, Siam, China, and Borneo.

1. *Microtropis ramiflora* Wight, Ic. 3 (3): 7. t. 977. 1845, Spicileg. Neilgherr. 1: 40. t. 48. 1846; Drury, Ind. Fl. 1: 230. 1864; Beddome, Fl. Sylv. 2: Anal. t. 9. f. 6. 1871; Lawson in Hook. f. Fl. Brit. Ind. 1: 613. 1875; Fyson, Fl. Nilgiri & Pulney Hilltops 1: 79, 2: f. 61. 1915; Gamble, Fl. Presid. Madras 1: 207. 1918; Fyson, Fl. So. Ind. Hill Sta. 1: 112, 2: 86. 1932.

*Paracelastrus ramiflorus* F. N. Will. in Bull. Herb. Boiss. II. 5: 224. 1905.

India: Nilgiri Mountains, *Cleghorn*, s. n., in 1857 (E); *Perrottet* s. n. (Ge, photo. A), 746 (Ge); Anamalai Mountains, *Fischer* 3730 (C), 3561 (E); Ootacamund, *Cleghorn* s. n., in 1856 (E); Madura District, Pulney Mountains, *Anglade* 67 (Ge, A); without locality, *Wight* 449, type collection (Gr, P, L, photo. A); prob. Nilgiri Mountains, *Gardner* 2847, in part<sup>1</sup> (Gr).

The Ceylon material currently referred to this species differs from the Indian plant and this we have segregated as *M. zeylanica*. Stapf has credited this species to Borneo (British North Borneo, Kinabalu, *Haviland* 1110), but because of its isolated range and distinctly smaller and more rounded leaves, which are smooth on the upper surface, we have considered this to represent a distinct species, *M. suborbiculata*. Sarawak, *Native collector* 2780, 2869, referred by Merrill to *Microtropis ramiflora* Wight have elongated inflorescences and certainly do not represent this species; the material is too scanty for certain identification.

## 2. *Microtropis zeylanica* sp. nov.

*Microtropis ramiflora* sensu Thwaites Enum. Pl. Zeyl. 72. 1864; Trimen, Syst. Cat. Fl. Ceyl. 18. 1885, Fl. Ceyl. 1: 269. 1893, non Wight.

Frutex vel arbor parva, glabra, ramis teretibus, ramulis ultimis 1-2 mm. diametro, plus minusve angulatis vel sulcatis; foliis coriaceis, plerumque ellipticis, 2-5.5 cm. longis, 1.3-4 cm. latis, rotundatis vel obscure latissime obtuseque acuminatis, basi rotundatis vel raro late acutis, margine revolutis, in sicco olivaceis vel brunneo-olivaceis, supra minute verruculosi, subtus paullo pallidioribus, laevibus, nervis primariis utrinque 5-7, gracilibus, supra obscuris, subtus magis distinctioribus, arcuato-anastomosantibus, reticulis laxi; petiolo circiter 2 mm. longo; inflorescentiis axillaribus, glomeratis, ad 5 mm. diametro, glomerulis sessilibus vel subsessilibus vel distincte (ad 3 mm.) pedunculatis; floribus confertis, sessilibus, 5-meris, sepalis suborbicularibus, 1.5-2 mm. diametro, coriaceis, margine erosis, submembranaceis; petalis subobovatis, rotundatis, circiter 2 mm. diametro; staminibus brevibus, disci

margini insertis; ovario anguste ovoideo, sursum angustato, 2-loculari.

Ceylon: *Thwaites*, C. P. 1228 (C, Ge, Gr holotype, P), 148 (C, M, P, U), *Gardner* 179 (N, photo. A).

Both of these Thwaites numbers impress one as being made up of two or more individual collections. The Ceylon form, long referred to *Microtropis ramiflora* Wight, although allied to that species, has more slender branchlets, less robust petioles, smaller leaves, up to 5 cm. long but more often only 3 cm. long and 2 cm. wide, smaller flowers, and often shortly peduncled capitate glomerules rather than strictly sessile ones.

## 3. *Microtropis suborbiculata* sp. nov.

*Microtropis ramiflora* sensu Stapf, Trans. Linn. Soc. II. Bot. 4: 140. 1894; Merr. Jour. Straits Branch Roy. As. Soc. (Spec. No.) 354. 1921 (Enum. Born. Pl. 354), non Wight.

Frutex glaber, ramis rigidis, subteretibus, ramulis perspicue 4-angulatis, 1.5-2 mm. diametro, atro-brunneis, internodiis 1-1.5 cm. longis; foliis crasse coriaceis, inter minores, orbiculato-ovatis vel orbiculato-ellipticis interdum suborbicularis, utrinque latissime rotundatis, margine revolutis, 2-3.5 cm. longis, 1.5-3 cm. latis, supra laevibus, subnitidis, in sicco atro-olivaceis, subtus pallidioribus, brunneis, nervis primariis utrinque 6-8, gracilibus, supra obscurissimis, subtus distinctioribus, leviter elevatis, arcuato-anastomosantibus, reticulis paucis, laxi, obscuris; petiolo crasso, atro-brunneo, circiter 2 mm. longo; glomerulis axillaribus terminalibusque, paucifloris, ad 5 mm. diametro; floribus 5-meris, sessilibus vel brevissimis pedicellatis; sepalis exterioribus circiter 1.5 mm. longis, 3 interioribus orbicularis, 2 mm. diametro, omnibus late rotundatis, subcoriaceis, brunneis, margine leviter erosis; petalis late ovatis rotundatis, sepala aequantibus; staminibus brevibus, disci margini insertis; ovario anguste ovoideo, 2-loculari.

BORNEO: British North Borneo, Mount Kinabalu, *Haviland* 1110, type (K, photo. A), altitude about 2400 m.

In spite of the extensive botanical field work that has been prosecuted on Mount Kinabalu since Haviland's visit in 1892, no collector seems to have relocated this species. Its alliance is clearly with *Microtropis ramiflora* Wight, and it is even more closely allied to the Ceylon form, long placed under Wight's species, that we here

<sup>1</sup> *Gardner* 2847 includes two different species, *M. ramiflora* Wight in the Gray Herb.; *M. latifolia* Wight in the Torrey Herb., N. Y. Bot. Gard.

recognize as specifically distinct under the binomial *Microtropis zeylanica*. The Mount Murud material (*Native collector 2870, Moulton 123, 124*) placed by Merrill under *M. ramiflora* Wight in 1921, cannot possibly represent this species as its cymes, with very immature flowers, are about 1 cm. long. It probably represents an undescribed species, but more adequate material is essential.

4. ***Microtropis Wallichiana*** Wight in Thwaites Enum. Pl. Zeyl. 71. 1858, Trimen Syst. Cat. Fl. Ceyl. 18. 1885; Lawson in Hook. f. Fl. Brit. Ind. 1: 613. 1875; Trimen, Fl. Ceyl. 1: 269, 1893; Gamble, Fl. Presid. Madras 1: 206. 1918.

*Paracelastrus Wallichianus* F. N. Will. Bull. Herb. Boiss. II. 5: 224. 1905.

CEYLON: *Thwaites 43* (A, Ge, Gr, C, M, N, U, photo. A); *Walker s. n.* (Gr); *Wight 582* (E); no collector or number, 5000 ft. ex herb. Kurz (C); no data (C).

The material included under *Thwaites 43* shows much variation, probably indicating that specimens from various sources were included under that number when the duplicates were arranged for distribution. With ample material it would not be at all surprising if *M. Wallichiana* as interpreted by Thwaites, Lawson, and Trimen, would be found to consist of more than one species. Gamble records this species from the Western Ghats and Travancore, India, but we have seen no material representing it from outside of Ceylon.

5. ***Microtropis Stocksii*** Gamble, Kew Bull. 132. 1916, Fl. Presid. Madras 1: 206. 1918.

*Microtropis latifolia* sensu Cooke, Bombay Fl. 1: 229. 1902, non Wight.

INDIA: Concan, *Stocks*, type collection (C, Gr. K, L, photo. A); Coimbatore, Paralan, *Barber 3971* (K); without locality, *Wight 447* (partly) (K, N, photo. A); Anamalai Mountains, *Barber 5418* (C), *Fischer 3569* (C), *Beddome 1281, 1279* (P); no locality or collector given (C).

Gamble was manifestly correct in separating this from *M. latifolia* with which it had been confused. *Wight 447*, on which *M. latifolia* Wight was based, is a mixture of two different species, *M. Stocksii* Gamble and true *M. latifolia* Wight. The former differs from *M. latifolia* in having its leaves verruculose only on the upper surface, the lower surface shining and prominently

veined. Lawson first published a description of Wight's species and this surely applies largely, if not wholly, to the other part of *Wight 447*, the form with broad, obscurely nerved leaves which are verruculose on both surfaces. *Fischer 3569* has much larger leaves than any of the other cited specimens.

6. ***Microtropis crassifolia*** Craib, Kew Bull. 349. 1926, Fl. Siam. Enum. 1: 280. 1926.

SIAM: Chantaburi, Chantabun, Kao Soi Dao, *Kerr 9665* (K holotype, UC, photo. A); Rachasina, Korat, Kao Lem, *Kerr 9923* (K) not seen; Kao Lem, Korat [Craib] *3552*, Dec. 27, 1920 (K, photo. A).

A species with the characteristically obscurely nerved, coriaceous, minutely verruculose leaves in these characters resembling *M. latifolia* Wight and *M. osmanthoides* Hand.-Maz., and manifestly allied to them. The flowers are 5-merous.

7. ***Microtropis obscurinervia*** sp. nov.

*Microtropis canthoides*\* Hand.-Maz. var. *insularis* Merr. & Chun. ex Tanaka & Odashima, Jour. Soc. Trop. Hort. 10: 372. 1938 (Contr. Hort. Inst. Taihoku Univ. 24: 372), *nomen nudum*.

Frutex glaber circiter 1 m. altus, ramis ramulisque rigidis, teretibus, atropurpureis vel purpureo-brunneis, ultimis 2 mm. diametro; foliis coriaceis, oblongis vel oblongo-ellipticis vel late oblongo-oblancoatis, 10-20 cm. longis, 3-8 cm. latis, apice plerumque late obtuse vel acute breviter acuminatis, deorsum angustatis, basi acutis, margine plerumque leviter revolutis, in sicco utrinque pallidis vel supra pallide olivaceis, minute verruculosi; nervis primariis utrinque 8-11, obscuris, interdum subobsoletis, secundariis reticulisque plerumque obsoletis; petiolo pallido, 0.5-1 cm. longo, 2-3 mm. crasso; inflorescentiis paucifloris, glomeratis, axillaribus terminalibusque, vix 5 mm. diametro; bracteis pallidis, 1 mm. longis, margine subciliatis; floribus 5-meris, sepalis inaequalibus, 2 exterioribus late ovatis, 3 interioribus suborbicularibus vel obovatis, circiter 3 mm. longis et 2.4 mm. latis, omnibus late rotundatis, margine subfimbriatis; petalis oblongis,

\* This is a manifest error for *osmanthoides* as it was to certain specimens originally determined as *Microtropis latifolia* Wight that the trinomial *Microtropis osmanthoides* var. *insularis* Merr. & Chun was applied (as an herbarium name only); Handel-Mazzetti never published *Microtropis canthoides*.

rotundatis, 3 mm. longis; staminibus disci margini insertis; ovario anguste ovoideo, 2-loculari; fructibus immaturis, viridibus, oblongo-cylindraceis, apiculatis, saltem 1.5 cm. longis, pericarpio striato.

CHINA: Hainan, Poting, *How* 73125, type (A), 73126 (A); Yaichow, *Liang* 63269 (A, N); Ngai District, Namlung, *Wang* 34004, 34709 (A, N); Ding-on District, Mo-cheung, *Wang* 36046 (A, N), in forested ravines and on slopes.

A species in the group with *M. latifolia* Wight and *M. osmanthoides* Hand.-Maz. differing from both in its inflorescence, flower, and vegetative characters.

8. *Microtropis latifolia* Wight ex Lawson in Hook. f. Fl. Brit. Ind. 1: 613. 1875; Gamble, Fl. Presid. Madras 1: 206. 1918; Fyson, Fl. Nilgiri Pulney Hilltops 3: 24. 1920.

INDIA: Madras, Nilgiri Mountains, *Wight* 447 (Gr, L, N in part, photo. A), Gamble 13465 (K); without locality, probably Nilgiri Mountains, *Gardner* 2847 (N).

In accepting Wight's binomial and in first describing the species Lawson gives its range from the Concan to the Nilgiris. He cites as a synonym "? *M. longifolia*, Wall. Cat. 4339 in part," which we have not actually seen, though we have examined a drawing thereof, and recognize it as an entity distinct from Wight's species. This collection was made by Gomez in Tavoy.

*Wight* 447 is a mixture of two distinctly different species, the second form being that described as *Microtropis Stocksii* Gamble. Lawson may have based his short description on both forms, but we interpret the type of *M. latifolia* Wight as that part of *Wight* 447 with the broader, very coriaceous and rugulose leaves, the latter character being mentioned in the description.

*Microtropis latifolia* is distinguished from *M. obscurinervia* Merr. & Freem. by its erose, not ciliate, membranaceous sepal-margins; from *M. osmanthoides* Hand.-Maz. by the cuneate, not subtruncate, leaf-bases and longer petioles; and from *M. Stocksii* Gamble by the leaves being verruculose on both surfaces.

9. *Microtropis osmanthoides* (Hand.-Maz.) Hand.-Maz. Sinensia 3: 189. 1933.

*Chingithamnus osmanthoides* Hand.-Maz. op. cit. 2: 128, 1 f. 1932.

*Microtropis latifolia* sensu Dunn & Tutcher, Kew Bull. Add. Ser. 10: 61. 1912, non Wight.

CHINA: Kwangsi: Seh-feng Dar Shan, *Ching* 7990 (N, photo. & fragm. A), an isotype of *Chingithamnus osmanthoides* Hand.-Maz.; Shah Man Taa Shan, Shang-sze District, near the Kwangtung border, *Tsang* 22390 (A) (May 26, 1933, fruits very immature), 24063 (A), 24130 (A); Hongkong, *Tutcher* 4625 (A).

This Chinese form is very similar to the Indian *M. latifolia* Wight, and is actually distinguished only by certain more or less obscure characters, the most obvious difference being that of the leaf shape. Here the leaf-bases are broadly acute to rounded-subtruncate and the petiole usually does not exceed 5 mm. in length. In *M. latifolia* Wight they are cuneate and longer petioled. We retain the two as distinct partly because of discontinuous distribution, partly because of the above more or less tangible differences. This is the form that Handel-Mazzetti described not only as a new genus (*Chingithamnus*), but also as the type of a new family *Chingithamnaceae* (*Sinensia* 2: 126-129. 1 f. 1932), which, in the following year (*Sinensia* 3: 189. 1933), he reduced to *Microtropis*. This seems clearly to be the form credited to Hongkong by Dunn and Tutcher, Kew Bull. Add. Ser. 10: 61. 1912, as *Microtropis latifolia* Wight, and accordingly Wight's species should be removed from the list of Chinese species and in its place *Microtropis osmanthoides* Hand.-Maz. should be accredited to Kwangtung Province. As noted above it is indeed very closely related to *M. latifolia* Wight of India, as represented by the type collection of the latter species, *Wight* 447. In the Chinese species the flowers are fewer and less crowded, while the calyx-segments are not entire but have distinctly ciliate margins. In both species the texture and venation of the leaves is remarkably similar, the leaf-surfaces on both sides being pale and verruculose when dry.

10. *Microtropis sessiliflora* sp. nov.

Frutex magnus vel arbor parva ad 8 m. alta, ramis rubro-brunneis, teretibus, ramulis circiter 2 mm. diametro; foliis oblongo-lanceolatis, subellipticis, raro obovatis, coriaceis, distincte acuminatis, basi late acutis vel leviter decurrentibus, 9-13 cm. longis, 2.5-7 cm. latis, in sicco supra pallide olivaceis, obscure rugulosis, subtus paulo pallidioribus, nervis primariis utrinque circiter 7, distantibus, distinctis, subtus magis prominentibus, secundariis obscuris; petiolo 5 mm. longo, rugoso, 2 mm. crasso; glomerulis plerumque in axillis defoliatis, paucifloris vel multifloris, usque

ad 5 mm. diametro; floribus omnibus sessilibus, parvis, 4-meris, bracteis inconspicuis; sepalis suborbicularibus, late rotundatis, 1 mm. diametro, margine membranaceis, erosis; petalis oblongo-ovatis, rotundatis, 2 mm. longis; filamentis brevissimis, margini disci insertis; ovario anguste ovoideo, sursum angustato, ut videtur 2-loculari; fructibus ellipsoideis, mucronatis, circiter 2 cm. longis et 1 cm. crassis, pericarpio laevi.

CHINA: Yunnan, Ping-Pien District, *Tsiang* 13365, type (Su, photo. A), a large shrub in forests; Wen-shan Hsien, *Tsai* 51817 (A), a tree 25 feet high.

The alliance of this species is clearly with *M. latifolia* Wight. Among the known species of this group it is characterized by its 4-merous, small flowers crowded in rather inconspicuous glomerules chiefly in the axils of fallen leaves.

#### Series PAUCINERVIAE

Leaves small, coriaceous, obtuse, few-nerved, the flowers crowded in small, axillary, solitary, very shortly peduncled capitate cymes. China.

11. *Microtropis paucinervia* Merrill & Chun in herb. sp. nov.

*Microtropis japonica* sensu Merr. Sunyatsenia 1: 197. 1934, non Hall. f.

Arbor parva, circiter 6 m. alta, glabra, ramis teretibus, ramulis ultimis distincte 4-angulatis, purpureo-brunneis, 1.2-2 mm. diametro; foliis coriaceis, ellipticis vel oblongo-ellipticis vel obovatis, 3-5 cm. longis, 1.5-3 cm. latis, obtusis vel rotundatis, basi acutis, margine revolutis, sicco supra viridibus vel olivaceis, subrugosis, subtus pallidioribus, nervis primariis utrinque circiter 5, gracilibus, adscendentibus, arcuato-anastomosantibus, reticulis indistinctis, subtus cum costa nervisque paulo elevatis; petiolo 2-3 mm. longo, rugoso; inflorescentiis in axillis superioribus, brevibus, subsessilibus vel breviter pedunculatis, pedunculo sub fructu crasso, 2-3 mm. longo; floribus confertis, 5-meris, circiter 2.5 mm. longis, sepalis subcoriaceis, rubro-brunneis, rugosis circiter 1.5 mm. longis, subreniformibus, margine fimbriatis; petalis 5, anguste oblongo-obovatis, apice leviter lacerato-fimbriatis obtusis, 2.2 mm. longis, staminibus 5, filamentis brevibus, disci margini insertis; ovario 2-loculari; fructibus solitariis, crassis, oblongo-ellipsoideis, 1.5 cm. longis, circiter 8 mm. diametro, haud vel brevissime apiculatis, sepalis persistentibus crassis, exterioribus rugosis, glabris orbiculari-rotundatis,

circiter 2.5 mm. latis, bracteolis parvis, quam sepala minoribus, crasse coriaceis, persistentibus.

CHINA: Hainan: Hing Lung, Po-Ting District, *How* 73695 (A); Hongkong, *Chun* 22999, 40294, type (Su, photo. & fragm. A), 40295 (Su, N); *Herb. Hongkong* 1001 (M), distributed as *Ilex*; Kwangsi: Shap Man Taai Shan, Shang-sze District, *Tsang* 22436 (A).

Among the small-leaved species this is characterized by its rounded or obtuse, few-nerved leaves, 4-angled branchlets, being somewhat similar to *M. japonica* Hall. f. but with shorter peduncled, almost subcapitate cymes, smaller flowers, and fimbriate sepals.

The binomial *Microtropis paucinervia* Merr. & Chun appears as a *nomen nudum* in Tanaka and Odashima, Jour. Soc. Trop. Hort. 10: 372. 1938 (Contr. Hort. Inst. Taihoku Univ. 24: 372), having been picked up by the latter authors from a named duplicate specimen.

#### Series RETICULATAE

Leaves small to medium, acute to acuminate, more or less reticulate on both surfaces, the nerves usually ascending, the flowers mostly few, in short axillary, solitary cymes. China.

12. *Microtropis reticulata* Dunn, Jour. Bot. 47: 375. 1909, Jour. Linn. Soc. Bot. 39: 469. 1911; Dunn & Tutcher, Kew Bull. Add. Ser. 10: 61. 1912.

CHINA: Kwangtung, Lantao Island, *Dunn* 6598 (K, photo. A).

This is the type collection and we have seen no specimens that exactly match it. The species somewhat remotely resembles *M. fokiensis* Dunn, but is distinguished by its reticulate leaves and more numerous primary lateral nerves, chiefly 10 to 12 on each side of the midrib (8-10 according to Dunn's description) as contrasted to about 6 more ascending ones in *M. fokiensis* Dunn, and its obtuse leaves. *Elacodendron Fortunei* Turcz., mentioned by Dunn in the discussion following his description is *Euonymus Fortunei* (Turcz.) Hand-Maz.; see Rehder, Jour. Arnold Arb. 19: 75. 1938 for an adjustment of the synonymy of the latter.

13. *Microtropis cathayensis* sp. nov.

Frutex glaber, 1-3 m. altus, ramis teretibus, plus minusve lenticellatis, ramulis 1.5-2 mm. diametro, teretibus vel obscure angulatis vel sulcatis, internodiis 2-3.5 cm. longis; foliis coriaceis,



oblongo-ellipticis vel oblongis, 5–11 cm. longis, 1.5–4.5 cm. latis, utrinque subaequaliter angustatis, breviter subobtusae acuminatis, basi acutis, in sicco supra olivaceis, subnitidis, subtus paullo pallidioribus, nervis primariis utrinque 6–8, subadscendentibus, utrinque cum reticulis subaxis leviter elevatis; petiolo 0.5–1 cm. longo; cymis axillaribus, solitariis, ad 1 cm. longis, breviter crasseque pedunculatis, simplicibus, densifloris, brevissime dichotome ramosis, ramis primariis vix 2 mm. longis, plerumque 3–4-floris; floribus omnibus sessilibus, confertis, 5-meris, circiter 3 mm. longis; bracteolis late ovatis, circiter 1 mm. longis; sepalis suborbicularibus, circiter 2 mm. diametro, interioribus tenuioribus, margine perspicue fimbriatis; petalis oblongo-ellipticis vel anguste oblongo-obovatis, rotundatis, 3 mm. longis; filamentis 1 mm. longis, disci margini insertis, antheris ovoideis, 0.5 mm. longis; ovario conico, obscurissime sulcato, vix 1 mm. longo, 2-loculari; capsulis oblongo-ellipsoideis vel deorsum leviter angustatis, brevissime apiculatis, 1–1.5 cm. longis, circiter 6 mm. diametro, pericarpio obscure longitudinaliter striato.

CHINA: Kwangsi, Shaap Man Taai Shan, near Shang-sze, Kwangtung border, *W. T. Tsang* 24771 (type, A), Nov. 28, 1934, a 4 foot shrub in thickets, *Tsang* 24783 (A), a shrub 8 ft. high, in fruit; Yao Shan, Tseung District, *C. Wang* 40215 (A); Kwangtung, Yeung Shan, *S. P. Ko* 51007 (Su), a small tree in woods.

A species suggesting *Microtropis reticulata* Dunn, and probably as closely allied to that species as any other described form. Its coriaceous, more or less reticulate larger leaves, the somewhat ascending lateral nerves which are more prominent on the upper than on the lower surface, its shortly peduncled, densely flowered cymes, and the prominently fimbriate inner sepals are characteristic.

#### 14. *Microtropis obliquinervia* sp. nov.

Frutex glaber, ramulis nitidis, teretibus vel novellis leviter compressis, 2 mm. diametro, internodiis 1–3 cm. longis; foliis oblongo-lanceolatis, coriaceis, tenuiter acute acuminatis, basi cuneatis vel decurrentibus, nitidis, supra olivaceis, subtus brunneis, 10–13 cm. longis, 3–4 cm. latis, nervis primariis utrinque 7, obliquis, utrinque distinctis, secundariis laxae reticulatis; petiolo circiter 5 mm. longo, 2 mm. crasso; cymis simplicibus, brevibus, axillaribus, 3-floris, 5 mm. longis; bracteis circiter 1.5 mm. longis latisque, apiculatis, margine submembranaceis; floribus 5-meris, sepalis reni-

formibus, subcoriaceis, circiter 1 mm. longis, 3 mm. latis, minute erosis; petalis late oblongis, submembranaceis; staminibus 5, disci margini insertis; ovario subpyramidato, 1-loculari.

CHINA: Kwangtung, Lok-cheong District, *Chun* 42514 (A) type, 42515 (A), a shrub; flowers white.

This is manifestly related to *Microtropis cathayensis* Merr. & Freem., differing in its longer, slenderly and sharply acuminate leaves and few-flowered inflorescences. An imperfect fruiting specimen, *Chun* 22727 (Su) from San Kong, Lin District, Kwangtung, probably belongs here. The fruits are apparently about 1 cm. long, and more or less ellipsoid; the pericarp is fallen.

#### SERIES MICROCARPAE

Leaves small, coriaceous, mostly rounded or obtuse; cymes dichotomous, elongated or in one species, rather short. India, Ceylon, Luzon.

15. *Microtropis microcarpa* Wight, Ic. 3 (3): 7. t. 975. 1845, Spicileg. Neilgherr. 1: 40. t. 46. 1846; Lawson in Hook. f. Fl. Brit. Ind. 1: 614. 1875; Cooke, Fl. Bombay 1: 229. 1902; Fyson, Fl. Nilgiri Pulney Hilltops 1: 80. 1915; Gamble, Fl. Presid. Madras 1: 207. 1918.

*Elacodendrum* (?) *nilghirens* Wall.<sup>1</sup> List no. 4409 (p. 250) 1832, *nomen nudum*.

*Microtropis ovalifolia* Wight, Ic. 3 (3): 7. t. 976. 1845, Spicileg. Neilgherr. 1: 40.

t. 47. 1846; Lawson, l. c.; Gamble, l. c.

*Paracelastrus microcarpus* F. N. Will. Bull. Herb. Boiss. II. 5: 224. 1905.

*Paracelastrus ovalifolius* F. N. Will. l. c.

INDIA: Nilgiri Mountains, *Wight* 471 (Gr, L, N, P, photo, A, type collection of *M. microcarpa* Wight), *Wight* 448 (C, Gr, K, L, N, P, type collection of *M. ovalifolia* Wight), *Clarke* 11452 (P), *Wilson* s. n. (A), *Hooker* f. & *Thomson* (Ge, L), *Fischer* 3932, 4592 (C), *Gouch* (E), *Cleghorn* (E), no collector (E), *Hohenacker* 1451 (A, Ge, L, P), *Perrottet* s. n. (Ge), 751 (P).

This is a reasonably uniform species apparently confined to the Nilgiri Mountains in southern India. In describing what he took to be two

<sup>1</sup> Wallich 4409, *Gordonia* ? *peduncularis* Wall. List p. 155. 1830 is a Penang specimen representing *Ixonanthes icosandra* Jack. On page 250, in the corrections, this number is reassigned to *Elacodendrum* ? *nilghirens* Wall., based on specimens from the Nilgiri Mountains collected by Nolan and by Wight; this is *Microtropis microcarpa* Wight.

distinct species in 1845, Wight states: "These two are very nearly allied species, but I think them quite distinct." Lawson and Gamble accepted Wight's conclusions and retained the two as distinct, crediting the distinguishing characters to Wight. Fyson in 1915 was able to separate them only on the distinctly unsafe basis of fruit color. In 1846 Wight recognized a third species, *Microtropis densiflora* Wight, with somewhat larger leaves than the other two that he recognized. With abundant material now available for study, and merely allowing slight variation within the species, we are constrained to reduce the *M. ovalifolia* Wight to *M. microcarpa* Wight, and for the present place *M. densiflora* Wight as the following variety:

15a. *Microtropis microcarpa* Wight var. *densiflora* (Wight) comb. nov.

*Microtropis densiflora* Wight, Ic. 3 (3): 7. t. 976. 1845, Spicileg. Neilgherr. 1: 40. t. 47. 1846; Lawson in Hook. f. Fl. Brit. Ind. 1: 614. 1875; Gamble, Fl. Presid. Madras 1: 207. 1918.

*Paraclastrus densiflorus* F. N. Will. Bull. Herb. Boiss. II. 5: 224. 1905.

INDIA: Nilgiri Mountains, Wight 470, type collection (Ge, Gr, L, P, photo. A), Gardner (M, N).

This has been consistently recognized as a distinct species by all botanists who have considered it since Wight described and illustrated it in 1845, which we suspect to be due more to the weight of authority than to any constant differential characters. It differs from *M. microcarpa* Wight in its leaves averaging somewhat larger than in the latter species, but some typical specimens of *M. microcarpa* have leaves as large as are those of *M. densiflora* Wight. Another differential character is its shorter inflorescences, but here again some specimens of *M. microcarpa* Wight match *M. densiflora* Wight in inflorescence-length, while on the same specimens other inflorescences are the typical elongated ones of the former species. We strongly suspect that what we here recognize as a variety will eventually be relegated to the synonymy of *M. microcarpa* Wight.

16. *Microtropis Curranii* Merr. Philip. Jour. Sci. Bot. 3: 238. 1908, Enum. Philip. Fl. Pl. 2: 482. 1923.

PHILIPPINES: Luzon, Benguet Province, Curran 4966 (U), 4970 (M, photo. A), 10846 (U),

Leaño 25135 (U), 25133 (A, M), Sandkuhl 231 (M), Merritt 14182 (M), Williams 1300 (A, N, U), Ramos 5731, 5706 (L, M).

This species grows in the mossy forest on Mount Tonglon (Santo Tomas) and on Mount Ugo at approximately 2500 m. altitude. Even as here interpreted two trends are more or less evident, the typical form with smaller, dark-colored leaves and short dark-colored cymes, and the other with somewhat larger, paler leaves, and paler slightly longer peduncled inflorescences (Williams 1300, Curran 10834). In some of the cited specimens both 4-merous and 5-merous ones occur on the same plant, although in the original description only 4-merous flowers were noted. Superficially the species most closely resembles the Indian *Microtropis microcarpa* Wight, but has much shorter inflorescences. One character, not hitherto noted, and this applies to the two varieties here recognized, is the peculiar indurated-glandular leaf-tips.

16a. *Microtropis Curranii* Merr. var. *zambalesensis* var. nov.

A typo differt internodiis brevioribus, foliis crassioribus utrinque magis attenuatis distincte acuminatis, cymis brevioribus.

PHILIPPINES: Luzon, Zambales Province, Ramos 4698 (M, U, photo. A), 5026 (M, U), Curran & Merritt 8071 (M, U).

A high altitude form growing on the Zambales range at an altitude of about 1500 m. This form is less distinct from the type than is the following one.

16b. *Microtropis Curranii* Merr. var. *obovata* var. nov.

A typo differt foliis magis coriaceis, paullo majoribus, obovatis vel oblongo-obovatis, basi decurrentibus, ad 6 cm. longis et 5 cm. latis, apice abrupte breviter obtuse apiculatis, apiculis valde glanduloso-induratis, petiolo paullo longiore.

PHILIPPINES: Luzon, Rizal Province, Mount Lumutan, Ramos 42238, April, 1923 (M, Ge, Su, photo. A). A 2 m. high shrub in the mossy forest at 1200 m. altitude.

The material available is rather poorly prepared, the three specimens examined having only immature flowers, and even these, and the inflorescences, not in good condition. For the present, at least, it seems best placed as a variety of *Microtropis Curranii* Merr., rather than to be characterized as a distinct species. As noted

above the species and the two varieties here segregated are characterized by the dark colored or black leaf tips which are indurated-glandular.

#### Series OLIGANTHAE

Leaves small to medium, mostly rather thin; cymes greatly reduced, 1-, 2-, or 3-flowered; flowers 5-merous. China, Burma.

#### 17. *Microtropis oligantha* sp. nov.

*Microtropis discolor* sensu Dunn, Jour. Linn. Soc. Bot. **39**: 469. 1911, non Wall.

Frutex circiter 1.2 m. altus, glaber, ramis teretibus, purpureo-brunneis, ramulis ultimis 1.5-2 mm. diametro, obscure angulatis vel sulcatis, internodiis 3-10 cm. longis; foliis oblongo-ellipticis, chartaceis, in sicco pallide olivaceis, subtus pallidioribus, subopacis vel obscure nitidis, distincte acuminatis, basi late acutis, nervis primariis utrinque circiter 8, gracilibus, haud perspicuis, arcuato-anastomosantibus, quam secundarii reticulisque sublaxis vix distinctioribus; petiolo 1.5 cm. longo; inflorescentiis axillaribus et in axillis defoliatis, solitariis vel depauperato-fasciculatis, pedunculo circiter 0.5 mm. longo, 1-3-floris; floribus 5-meris, sepalis suborbicularis vel subreniformibus, late rotundatis, subchartaceis, 1.5-2 mm. longis; petalis oblongo-ellipticis vel ellipticis, circiter 3.5 mm. longis, 1.5-1.8 mm. latis; filamentis disci margini insertis, 1 mm. longis, antheris ellipsoideis, 0.5 mm. longis; ovario anguste ovoideo, 2-loculari; bracteolis binis, oblongo-ovatis, acutis vel acuminatis, 2 mm. longis.

CHINA: Yunnan, Fen Chen Lin Peak, alt. about 2500 m., *Henry 10851* (A holotype, N, Su), indicated as a shrub about 4 feet high, flowers white, the label on one of the sheets examined bearing merely the note "South of Red River."

Dunn enumerated this as representing *Microtropis discolor* Wall., which it resembles only rather superficially, and to which it is not closely allied because of the presence of a distinct disk. Wallich's species always has peduncled cymose inflorescences. This Chinese form is characterized by having 1- or at most 3-flowered peduncles, the entire inflorescence being less than half as long as the petioles.

#### 18. *Microtropis biflora* sp. nov.

Frutex glaber, circiter 1.5 m. altus, ramis pallidis, teretibus, ramulis plerumque 1 mm. diametro, obscure angulatis vel sulcatis, inter-

nodis 4-7 cm. longis; foliis oblongo-ellipticis vel late oblongo-lanceolatis chartaceis, in sicco utrinque subcinereo-viridibus vel pallide olivaceo-viridibus, nitidis, subtus paullo pallidioribus, 8-10 cm. longis, 2-3.5 cm. latis, graciliter acute acuminatis, basi cuneatis; nervis primariis utrinque 7-9, gracilibus utrinque leviter elevatis, arcuato-anastomosantibus, reticulis sublaxis, leviter elevatis; petiolo circiter 3 mm. longo; inflorescentiis axillaribus, brevissime (1-2 mm.) pedunculatis vel subsessilibus, 2-floris, sub anthesin petiolum subaequantibus; floribus 5-meris, sessilibus vel subsessilibus, bracteis ovatis, acutis, 1 mm. longis; sepalis late ovatis vel subreniformibus, subrugosis, margine membranaceis, obscure ciliatis, circiter 1 mm. longis; petalis oblongo-ellipticis, rotundatis, 3 mm. longis; staminibus circiter 1 mm. longis, filamentis gracilibus, disci margini insertis; ovario ovoideo, 2-loculari; fructibus oblongo-ellipsoideis, utrinque angustatis, leviter apiculatis, 12-14 mm. longis, circiter 6 mm. diametro, pericarpio longitudinaliter striato.

CHINA: Kwangtung, Loh Fau Shan, S. P. K. *52476*, December 12, 1932, a shrub in forests, flowers yellowish white (A, holotype), Y. Tsiang *1696* (Su, U.C.), December 23, 1928, an undershrub 1.5 m. high, altitude about 250 m. in forests.

This species is essentially characterized by its very short, subsessile or shortly peduncled, 2-flowered inflorescences.

#### 19. *Microtropis triflora* sp. nov.

*Microtropis fokiensis* Dunn, var. *longipedunculata* Cheng, Contr. Biol. Lab. Sci. Soc. China **9**: 199. 1934.

Frutex circiter 4 m. altus, glaber, ramis ramisque teretibus vel ramulis obscure angulatis, obscure lenticellatis, brunneo-purpureis, ultimis 1 mm. diametro, internodiis 2-3 cm. longis; foliis lanceolatis vel oblongo-lanceolatis, 6-9 cm. longis, 1.5-2 cm. latis, in sicco olivaceo-viridibus, supra nitidis, subtus paullo pallidioribus, chartaceis, utrinque subaequaliter angustatis, graciliter acuminatis, basi cuneatis vel decurrentibus; nervis primariis utrinque 6, gracilibus, obscuris, subadscendentibus, obscure anastomosantibus, laxe reticulatis; petiolo circiter 1 cm. longo, pallido; cymis simplicibus, axillaribus, solitariis, trichotomis, 3-floris, circiter 1.5 cm. longis, flore centrali sessili, 2 lateralibus breviter (1-2 mm.) pedicellatis, pedunculo gracili, 1 cm. longo; floribus 5-meris, sepalis persistentibus orbiculari-ovatis, circiter 1.5 mm. longis; fructibus oblongo-



ellipsoideis vel anguste ellipsoideo-obovoideis, 1.4 cm. longis, deorsum angustatis, apice breviter apiculato-acuminatis, pericarpio laevi.

CHINA: Szechuan, Nanchuan-hsien, Fang 5756 (A, N, Su), a shrub in thickets.

Rehder, Jour. Arnold Arb. 11: 165. 1930, referred this collection to *M. fokiensis* Dunn, and whether considered as a variety, as Cheng proposed four years later, or as a species, as we propose, its alliance with *M. fokiensis* Dunn is close. It differs not only in the longer peduncles but also in its 3-flowered cymes. Normally Cheng's varietal name would be accepted in changing the status of this form from a variety to a species. It was abandoned because various other species of the genus have very much longer peduncles than does this Szechuan form.

Wang 35276, 35652, 36559 from Hainan, referred by Rehder, Jour. Arnold Arb. 18: 216. 1937, to *M. fokiensis* Dunn. var. *longipedunculata* Cheng, we place under *Microtropis submembranacea* Merr. & Freem.

## 20. *Microtropis Henryi* sp. nov.

Frutex glaber, 2–2.5 m. altus, ramis teretibus, internodiis 2–4 cm. longis, ramulis 1.5–2 mm. diametro, sursum subangulatis; foliis oblongis vel oblongo-ellipticis, submembranaceis, laevibus, utrinque subaequaliter angustatis, distincte acuminatis, basi acutis, plus minusve decurrentibus, 13–15 cm. longis, 3.5–5 cm. latis, in sicco pallide olivaceo-viridibus, supra subnitidis, subtus paulo pallidioribus, nervis primariis utrinque 5 vel 6, gracilibus, curvato-adscendentibus, distantibus, laxe arcuato-anastomosantibus, supra subobscuris, subtus elevatis, distinctis, reticulis laxis, haud perspicuis; petiolo circiter 1 cm. longo; inflorescentiis cymosis, ut videtur paucifloris, in axillis defoliatis vel supra-axillaribus, simplicibus, pedunculo sub fructu 8–12 mm. longo, fructu centrali sessili, duobus lateralibus in ramulis patulis 3–4 mm. longis; sepalis persistentibus 4, pallidis, ovatis, circiter 1.5 mm. longis; fructibus pallide subolivaceis, laevibus, subglaucis, oblongo-ellipsoideis, brevissime apiculatis, circiter 13 mm. longis, pericarpio haud striato; pedunculo 6–12 mm. longo.

CHINA: Yunnan, Mengtze, Henry 11443 (N, K holotype, photo. A); Ho-kou, Tsai 52629 (A), the latter a shrub 7 ft. high, in forests, alt. about 500 m. The Henry number, on the Kew label, is indicated as a 6 ft. shrub in forests at 5000 ft. alt., while the sheet in the N. Y. Botanical Garden herbarium (actually Henry's native col-

lector) bears the annotation "old wood, shrub 7–8', not a climber, Dec. 16 (Ho)."

This in general resembles some forms of *Microtropis bivalvis* Wall., but has 4-merous flowers, shorter peduncles, the cymes (judging from the fruiting specimens) simple, bearing two lateral branches, each with a single smooth glabrous fruit, with a sessile terminal one between the spreading lateral branches. The leaves are somewhat larger than are most of those in Wallich's species and are thinner in texture.

## 21. *Microtropis Beddomei* sp. nov.

Frutex vel arbor parva, glabra, ramis pallidis laevibus, ramulis gracilibus, rubro-brunneis, teretibus vel novellis plus minusve compressis, 1 mm. crassis; foliis late oblongo-lanceolatis, sursum angustatis, perspicue caudato-acuminatis, acumine circiter 1.5 cm. longo, subobtusis, basi cuneatis, 6–7 cm. longis, 2–3 cm. latis, chartaceis, utrinque viridibus; nervis primariis utrinque 3–4, valde adscendentibus, quam secundarii magis distinctioribus; petiolo 5 mm. longo; cymis axillaribus vel extra-axillaribus, brevibus, 3-floris, glomeratis, vel brevissime (1–2 mm.) pedunculatis, 2–3 mm. diametro; floribus parvis, 4-meris, sessilibus, vix 2 mm. diametro; bracteis pallidis, 2 mm. longis; sepalis subreniformibus, circiter 1 mm. longis, 1.5 mm. latis, late rotundatis, submembranaceis; petalis oblongo-ovatis, 1.5 mm. longis, 1 mm. latis, rotundatis; staminibus disci margini insertis; ovario late ovoideo, 1 mm. longo, 2-loculari.

BURMA: Tenasserim, R. H. Beddome 1274 ex herb. Mus. Brit. (P, photo. A), without further data.

Strongly characterized by its oblong-lanceolate, caudate-acuminate, few nerved leaves and its sharply ascending primary nerves. The sessile or very shortly peduncled cymes are all 3-flowered, flowers all sessile. The vegetative characters resemble some forms of *Microtropis fokiensis* Dunn, but the two species are not very closely allied.

### Series HEXANDRAE

Similar to the preceding series but the stamens usually 6. China.

## 22. *Microtropis hexandra* sp. nov.

Frutex glaber, circiter 3 m. altus, ramis ramisque gracilibus, ramis teretibus, ramulis plus minusve 4-angulatis, ultimis vix 1 mm. diametro; foliis oblongo-ellipticis, chartaceis vel junioribus

submembranaceis, in sicco supra olivaceis, subtus pallidioribus, utrinque subnitidis, 5-7 cm. longis, 1.5-3 cm. latis, utrinque subaequaliter angustatis, apice leviter acuminatis, acumine acuto vel subobtus, basi acutis; nervis primariis utrinque circiter 7, gracilibus, arcuato-anastomosantibus, subtus cum secundariis reticulisque sublaxis leviter elevatis, haud conspicuis; petiolo 5-8 mm. longo, canaliculato; cymis simplicibus, axillaribus extra-axillaribusque, vix 1 cm. longis, bifloris vel rariter trifloris, pedicellis 1-2 mm. longis, apice bibracteolatis, bracteolis ovatis, acutis, circiter 1 mm. longis; pedunculo 5-6 mm. longo; floribus albidis, 5-6-meris, circiter 3.5 mm. longis; sepalis 5, orbiculari-ovatis vel subreniformibus, late rotundatis, circiter 1.5 mm. longis, ad 2 mm. latis; petalis 6 (raro 5), oblongo-ellipticis vel anguste oblongo-obovatis, apice rotundatis, 3 mm. longis; staminibus 6 (raro 5), antheris ellipsoideis, 0.8 mm. longis, filamentis latis, tenuibus, quam antherae brevioribus, disci tenui margini insertis; ovario ovoideo-ellipsoideo, 1.3 mm. longo, 2-loculari.

CHINA: Yunnan, Ping-pien Hsien, H. T. Tsai 60498 (type, A), June 29, 1934, a shrub in ravines, altitude about 1400 m.

A species superficially resembling *Microtropis discolor* Wall. characterized by its smaller leaves, 2-, rarely 3-flowered, simple short cymes, and in its usually 6-merous flowers. The thin, broad, short filaments are attached to the margin of an equally thin disk. The sepals are usually 5, the petals and stamens usually 6, rarely 5. Most of the cymes are 2-flowered, both flowers shortly pedicelled, but when 3-flowered, the central flower is sessile and the two lateral ones pedicelled.

#### Series CHLOROCARPAE

Leaves mostly rather small, acuminate; cymes dense or rather open, few- to rather many-flowered; fruits, where known, often green, the pericarp usually longitudinally striate (Formosa, China, Hainan, Indo-China).

#### 23. *Microtropis chlorocarpa* sp. nov.

Frutex glaber, ramis teretibus, plerumque purpureo-brunneis, ramulis subangulatis vel sulcatis, ultimis 1-1.5 mm. diametro, internodiis 2.5-4 cm. longis; foliis oblongo-ellipticis vel oblongis, chartaceis, 6-10 cm. longis, 2.5-4 cm. latis, utrinque subaequaliter angustatis, distincte acuminatis, basi acutis, in sicco viridibus, subtus paulo pallidioribus; nervis primariis utrinque circiter 7, gracilibus, haud perspicuis sed utrin-

que leviter elevatis, arcuato-anastomosantibus, reticulis sublaxis; petiolo 8-10 mm. longo; cymis axillaribus, solitariis, breviter pedunculatis, paucifloris, sub fructu circiter 2.5 cm. longis, dichotomis, ramis primariis brevissimis, crassis, circiter 3 mm. longis, 2 mm. diametro, singulis bifloris, pedicellis rugosis, sub fructu brevissimis, crassis, circiter 2 mm. longis et 1 mm. diametro; pedunculo 8 mm. longo; bracteis late triangulari-ovatis, obtusis, circiter 1 mm. longis, bracteolis paulo minoribus; sepalis persistentibus 5, reniformi-ovatis, late rotundatis, circiter 1.5 cm. longis, 2.2 mm. latis, margine submembranaceis; capsulis oblongis, subcylindraceis, 1.2-1.4 cm. longis, apiculatis, pericarpio in sicco atro-viridi, longitudinaliter striato.

INDO-CHINA: Annam, Mount Bana, J. & M. S. Clemens 4312 (A holotype, N), July 22, 1927, a shrub or small tree near the summit, altitude probably about 1200 m.

A species essentially characterized by its rather slenderly peduncled few-flowered cymes, with the two short thick lateral branches each bearing two very shortly pedicelled capsules, the pedicels rugose, thick, at most 2 mm. long. The nearly mature fruit is dark green when dry, the pericarp being somewhat longitudinally striate. The specimens were distributed as *Microtropis pallens* Pierre, but this form is remote from that species.

#### 24. *Microtropis tetragona* sp. nov.

Frutex parvus, glaber, ramis teretibus, distincte lenticellatis, brunneis, ramulis ultimis acute 4-angulatis, purpureo-brunneis, 1.5-2 mm. diametro, internodiis 3-4 cm. longis; foliis chartaceis vel submembranaceis, oblongo-ellipticis, in sicco viridibus vel olivaceo-viridibus, subtus paulo pallidioribus, 9-13 cm. longis, 3.5-5 cm. latis, perspicue obtuse subfalcato-acuminatis, acumine circiter 1.5 cm. longo, basi late acutis; nervis primariis utrinque 6-8, gracilibus, subpatulis, laxe arcuato-anastomosantibus, utrinque distinctis, paulo elevatis, reticulis primariis sublaxis; petiolo pallido, rugoso, 5-7 mm. longo; cymis axillaribus, solitariis, junioribus circiter 1.5 cm. longis, dichotomis, paucifloris, pedunculo 5-8 mm. longo, ramis primariis 3-4 mm. longis, 2- vel 3-floris; floribus 5-meris (immaturis), ovario anguste ovoideo, ut videtur 2-loculari; filamentis disci margini insertis; fructibus oblongo-ellipsoideis, 1.5-1.8 cm. longis, perspicue apiculatis, pericarpio viridi, distincte longitudinaliter striato; sepalis persistentibus reniformibus, circiter 1 mm. longis, 1.5-2 mm. latis.

CHINA: Kwangsi, Ping-nan District, Yao Shan, *C. Wang* 40779 (A), January 2, 1937, a small shrub in dense forests.

A species in many respects resembling *Microtropis Henryi* Merr. & Freem. of Yunnan, but with somewhat more numerous, less ascending lateral nerves, somewhat shorter petioles, strictly axillary cymes, longer fruits, the green pericarp distinctly striate, 5-merous flowers, and sharply angled ultimate branchlets. It is barely possible that *Tsai* 51681, from Yunnan, a very imperfect specimen, may represent the same species.

25. *Microtropis micrantha* (Hay.) Koidz. Bot. Mag. Tokyo 40: 335. 1926; Sasaki, Pl. Formos. 274. 1928; Makino & Nemoto, Fl. Jap. ed. 2, 686. 1931; Kanehira, Formosan Trees ed. 2, 396. 1936; Masam. Fl. Formos. 128. 1936.

*Cassine micrantha* Hay. Ic. Pl. Formos. 3: 61. 1913.

FORMOSA: Byoritsu, *Kawakami*, not seen (herb. Tokyo), (photo. A).

This species has by far the largest leaves among the Japanese-Formosan species, being chartaceous or membranaceo-chartaceous, the largest ones 10 by 5.5 cm. The number of floral parts is not given in the original description, the type having immature flowers. We judge that the species is closely allied to *Microtropis submembranacea* Merr. & Freem. We are under obligations to Dr. T. Nakai for his courtesy in supplying us with a photograph of Hayata's type.

26. *Microtropis submembranacea* sp. nov.

*Microtropis fokiensis* sensu Merr. & Chun, Sunyatsenia 2: 268. 1935, non Dunn.

Frutex glaber, circiter 4 m. altus, ramis teretibus, brunneis vel subpurpureo-brunneis, ramulis junioribus distincte 4-angulatis, circiter 1 mm. diametro, internodiis 1.5-4 cm. longis; foliis submembranaceis vel subchartaceis, in sicco viridibus vel pallide viridibus, nitidis, subtus paullo pallidioribus, plerumque oblongo-ovatis, 3.5-8 cm. longis, 1.5-3 cm. latis, distincte acuminatis, acumine obtuso, basi late acutis vel acutis et plus minusve decurrentibus; nervis primariis utrinque 5-7, gracilibus, leviter elevatis, arcuato-anastomosantibus, reticulis sublaxis; petiolo circiter 5 mm. longo; cymis axillaribus, pedunculatis, 1-2 cm. longis, 1-1.5 cm. latis, paucifloris, dichotomis, pedunculo 5-8 mm. longo, ramis primariis sub-

patulis, ad 4 mm. longis, 3-floris, flore centrali sessili, duobus lateralibus breviter pedicellatis; floribus 5-meris, circiter 3 mm. longis, pallidis, bracteis oblongo-ovatis, acutis, 1 mm. longis, margine minute erosis, bracteolis ovatis, 0.5 mm. longis; sepalis leviter rugosis, late ovatis vel subreniformi-ovatis, rotundatis, circiter 1 mm. longis, haud erosis; petalis membranaceis, ellipticis, rotundatis, circiter 2.5 mm. longis; disco 5-lobato, staminibus circiter 1 mm. longis, inter lobis disci insertis; ovario ovoido, 2-loculari; fructibus viridibus, laevibus, ellipsoideis vel leviter obovoideis, apiculatis, circiter 1.5 cm. longis, pericarpio obscure striato.

CHINA: Kwangtung, Yu-Yuen District, Tsing Kai Tung, *Y. Lee* 2090 (A); Sun-Yi District, *C. Wang* 37901, 37895, November 17, 1934 (A). Hainan, Poting, *F. C. How* 73635, 73628 (A), Sept. 4, 1935, in forests, alt. 1000 m.; Five Finger Mountains, and without locality, *C. Wang* 35276 (type), 35278, 35538, 35652, 36559 (A, N); Fan Yah, *N. K. Chun* & *C. L. Tso* 44040 (A, N), a shrub 4 m. high in forests, alt. 1000 m.

This species is particularly characterized by its disk being distinctly lobed, the filaments attached to the margins of the disk and alternating with the lobes. The disk lobes are usually about twice as wide as long, broadly rounded, truncate, or obscurely 2-toothed, mostly about 0.25 mm. long and 0.5 mm. wide.

27. *Microtropis Petelotii* sp. nov.

Frutex vel arbor glabra, circiter 15 m. alta, ramis teretibus, lenticellatis, purpureo-brunneis, ramulis plus minusve 4-angulatis, 1.5 mm. diametro; foliis oblongo-ellipticis vel oblongis, chartaceis, 8-13 cm. longis, 2.5-5 cm. latis, pallide olivaceis, opacis, utrinque subaequaliter angustatis, apice acutis vel leviter acuminatis, basi acutis, margine plerumque pallidis, nervis primariis utrinque 7-10, gracilibus, haud perspicuis, arcuato-anastomosantibus laxae reticulatis; petiolo 8-10 mm. longo; cymis axillaribus vel supra-axillaribus, solitariis, pedunculatis, usque ad 3 cm. longis, 2-3 cm. latis, ter-dichotomis, pedunculo 1-1.5 cm. longo; floribus plerumque in triadibus in ramulis ultimis dispositis, flore mediani sessili, lateralibus brevissime pedicellatis; bracteis bracteolisque triangulari-ovatis, subacutis vel obtusis, margine brunneis, brevissime ciliatis; floribus numerosis, 5-meris sepalis concavis, reniformi-orbicularis, rotundatis, 1 mm. longis, margine breviter ciliato excepto glabris; petalis tenuibus, oblongo-ellipticis, 2.5-3 mm. longis, 1-1.2 mm. latis, apice rotun-

datis; staminibus extra marginem disci insertis, filamentis circiter 1 mm., antheris subreniformibus, vix 0.5 mm. longis; disco tenui, truncato, circiter 2 mm. diametro, 0.8 mm. alto; ovario glabro, ovoideo, 2-loculari, stylis crassis, 0.5 mm. longis; fructibus immaturis subcylindraceis, rectis vel leviter curvatis, acutis vel apiculatis, circiter 12 mm. longis, 3-4 mm. crassis.

INDO-CHINA: Tonkin, Fan Tsi Pan, route to Lo Qui Ho, near Chapu, altitude about 1900 m., *Péclot* 4428 (A type, N). CHINA: Yunnan, Mengtze, *Henry* 11417 (K), 10491 (abnormal fruit) (A, M), 10491A (abnormal fruit) (A, K); Ping-pien Hsien, *Tsai* 61953 (A); Kwangsi, without locality, *Lau* 24879 (A).

This species is characterized by its peduncled, rather lax, thrice dichotomous cymes that are about as wide as long, but much shorter than the leaves. The larger and usually rostrate-acuminate fruits of *Henry* 10491, which are 1.5 to 2.5 cm. long, are abnormal, due to the presence of insect larvae. The filaments are attached to the free disk on its back just below the margin.

28. *Microtropis fokienensis* Dunn, Jour. Linn. Soc. Bot. **38**: 357. 1908, **39**: 469. 1911; Dunn & Tutchener, Kew Bull. Add. Ser. **10**: 61. 1912; Rehder, Jour. Arnold Arb. **11**: 165. 1930 (p. p.), **18**: 216. 1937.

*Myrsine Chaffonjoni* Lév. Fl. Kouy-Tcheou 287. 1914; Rehd. Jour. Arnold Arb. **18**: 216. 1937.

*Cassine illicifolia* Hay. Ic. Pl. Formos. **3**: 60. 1913.

*Cassine Matsudai* Hay. Ic. Pl. Formos. **9**: 18. t. 11. 1920.

*Otherodendron Matsudai* Hay. l. c. in syn.

*Microtropis Matsudai* Koidz. Bot. Mag. Tokyo **40**: 335. 1926; Sasaki, Pl. Formos. **274**. 1928; Mak. & Nem. Fl. Jap. ed. 2, **685**. 1931; Masam. Fl. Formos. **128**. 1936.

*Microtropis illicifolia* Koidz. Bot. Mag. Tokyo **40**: 334. 1926; Sasaki, Pl. Formos. **274**. 1928; Mak. & Nem. Fl. Jap. ed. 2, **685**. 1931; Kanehira, Formos. Trees ed. 2, **394**. f. 352. 1936; Masam. Fl. Formos. **128**. 1936.

*Microtropis illicifolia* Koidz. var. *yunnanensis* Hu, Bull. Fan. Mem. Inst. Biol. **7**: 214. 1936.

CHINA: Anhwei, Wengshan, *Cheng* 4197 (Su); Hwan Shan, *Ling* 1184 (9610), *Ching* 3021 (A, Su); Chekiang, Tien Tai Shan, *Chiao* 14480 (A,

E, U, UC); Tihtaishan, *Ching* 1427A (N); Fukien, Hinghwa Distr. *Chung* 1046 (UC); Yen-ping, *Dunn* 2394, isotype (A, Su); Kwangsi, Tong Shan, Waitsap Distr., *Tsang* 22791 (A); Kwangtung, Swatow, *Dunn* 17260 (Su); Kweichow, Kouy-yang, *Bodinier & Chaffanjon* 2048, type of *Myrsine Chaffonjoni* Lév. (photo. & fragm. A); Chengfeng, *Tsiang* 4350 (N, Su, UC, photo. A); Kiao-Feng San, Pinfa, *Teng* 875 (Su); Szechuan, Nanchuan-hsien, *Fang* 5756 (E); Yunnan, *Forrest* 17728 (A, E), distributed as *Olea* and as *Sarcococca*; Kambaiti & Tengyueh, *Rock* 7536 (A, N, U, UC); Wenshan Hsien, *Tsai* 51664 (A), 51738 (A); no locality, *Tsai* 55986 (A) (the type collection of *M. illicifolia* var. *yunnanensis* Hu). FORMOSA: Arisan, *Faurie* 1538 (M), *Wilson* 9746 (A), 10847 (A), 10916 (A); Kanehira & Sakaki 68 (A); Kanehira 3066 (N), 3067 (U, N, fragm. A); *Faurie* 1538 (M); Mount Buizan, April 1919, *Matsuda* (photo. A), type of *C. Matsudai*; Bunkoko, *Faurie* 1669 (M); Mount Daibuzon, Jan. 1919, *Matsuda* 306 in Herb. Univ. Taihoku (fragm. A).

In comparing *M. illicifolia* Koidz., and *M. illicifolia* Koidz. var. *yunnanensis* Hu with *M. fokienensis* Dunn, no constant tangible differences were noted. In the Formosan specimens the flowers seem to be constantly 4-merous, while in Chinese material representing *M. fokienensis* they are indifferently 4- and 5-merous. The only difference we have noted as between Formosan and Chinese material is that on the normally 3-flowered peduncles, the lateral flowers are sessile in the Chinese plants and are very slightly pedicelled in the Formosan specimens. The type of *M. Matsudai* Koidz. was from Formosa, but judging from the scanty material we have seen representing this species, it is scarcely to be distinguished from *M. illicifolia* Koidz. = *M. fokienensis* Dunn.

#### Series DISCOLORES

Leaves small or medium, acuminate; cymes short, few-flowered; disk entirely wanting, the stamens attached to the basal parts of the petals and alternate with them, the petals keeled inside; fruits (unknown in one species) subfurfuraceous-lepidulote. India, Burma, Siam, Indo-China, Yunnan, ? Penang.

29. *Microtropis discolor* (Wall.) Wall. List no. 4337, 1830; Arnott, Ann. Nat. Hist. **3**: 151. 1839; Lawson in Hook. f. Fl. Brit. Ind. **1**: 614. 1875; Kurz, Jour. As. Soc. Bengal **44** (2): 160. 1875, For. Fl. Brit.



- Burma 1: 251. 1877; Gamble, *Trees Shrubs Darjeeling* 18. 1878; Duthie, N. W. Ind. Pl. 37. 1885; King, Jour. As. Soc. Bengal 65 (2): 341. 1896 (Mater. Fl. Malay. Penin. 2: 627); Strachey, Pl. Kum. 32. 1906; Ridley, Fl. Malay Penin. 1: 444. 1922; Craib, Fl. Siam Enum. 1: 281. 1926; Kanj. & Das, Fl. Assam 1: 267. 1937.
- Cassine discolor* Wall. in Roxb. Fl. Ind. 2: 378. 1824.
- Ilex dipyrena* Wall. List quoad no. 4327B. 1830, *nomen nudum*.
- Euonymus garcinifolius* Wall. in Roxb. Fl. Ind. 2: 403. 1824, ed. 2, 1: 628. 1832; Drury, Ind. Fl. 1: 231. 1864.
- Microtropis garcinifolia* Wight, Ic. Pl. Or. 3 (1): 4. t. 761. 1843; Kurz, Jour. As. Soc. Bengal 44 (2): 160. 1875.
- Microtropis pallens* sensu Craib, Fl. Siam. Enum. 1: 281. 1926, non Pierre.
- INDIA: Assam, no definite locality, *Bal* 693 (C), *Griffith* s. n. (C, N), *Jenkins* s. n. (E, C, L), *Masters* s. n. (C), *Mann* s. n. (C); Abor Expedition, *Burkill* 36277, 36386, 36484 (C); Lushai Hills, *Parry* s. n. (C), *Gage* 159 (C); Kohima, *Clarke* 41399A (C), 41399B (C); Kohima, *Clarke* 41399A (P); Jowai, *King's collector* s. n. (C); Jaintia Hills, *King's collector* s. n. (C), *Clarke* 17855 (P), 18016 (E); Baligau, near Naga Hills, *Prain's collector* 424, 488 (C); Nukin Hills, *Masters* s. n. (C); *Simons* (E, L, P); Khasia Hills, no collector, Aug. 150 (C), no collector 106 (C); Jarain, *Kanjibai* 2723, 2600, 2817 (C); *native collector Calcutta Bot. Gard.* s. n. (C, L, P, photo. A); *Mario*, *Clarke* 14283 (C), 15363 (C, P); *Maododoom*, *Clarke* 42916 (C, P), *Gammie* 463 (C); *Griffith* s. n. (Gr, L); *Hooker & Thomson* s. n. (C, E, Ge, L, N, P); *Kurz* 106 (C, narrow leaved form), 296 (C); *McClelland* 1846 (C); Nya Bungalow, *Clarke* 37315, 37321 (U); Bengal, *Clarke* 27508 (P), 9716 (P), 9718 (C, P), 13577 (E, P); *Griffith* 1980/1 (C, Ge, L, N, P); *Jalpaiguri*, *Parker* s. n. (A); *Khontimari*, *Parkinson* 3458 (A, Gr, N); no locality, *Hamilton* 619 (E); Jaldaka Valley, Chumbi, *Scaright* 126 (C); Duphla Hills, *Lister* 122 (C); Kossyah & Jynteah Hills, *Gallatly* 666 (C); Rumpet, *Clarke* 12587B (C); Sakha Jhora, *Prain's collector* s. n. (C); Sikkim, without locality, *Kurz* s. n. (C), no collector (Ge), *Anderson* (P), *Beddome* 1293 (P), *Hooker* (C, Ge, Gr, E, L, N), *King* in 1878 (P), 128 1/2, 1022, 2315 (C), *Thomson* (Ge, L, P); Khursiong, *Clarke* 35931 (Ge); Munsong, *Craib* 284 (C); Rishap, *Dongbo* (C); Rungbi, no collector (C); Sureil, *Smith* 688, 694 (C); Silhet, no collector (C), *Wallich* 4337, type collection (Ge, Gr, M), 4337B (A, E, Ge, P, photo. A), Kumaon, *Wallich* 4327B (L), issued as *Ilex dipyrena* Wall. No localities or collectors indicated, ex herb. Calcutta (E), ex Herb. Watt (E), *Falconer* 230 (C), *McLellan* (E). BURMA: Amherst, Dawna Range, *Lace* (E); Kachin Hills, Shaik Mokim (C); Karen, *Brandis* (C); Katha District, *Lace* (C, E, photo. A); Linainka, *Toppin* 6292 (C); Martaban and Pegu, *Kurz* 175 (C); Nam Tesong, *Toppin* 6308 (C); Nam Tamai, *Ward* 9113, 9177 (A); Phyet, *Toppin* 6249 (C); Pegu, *Brandis* (C); Mergui, Sandawut, *Parker* 2774 (A); King Tung, South Shan States, *MacGregor* 1200 (C, E); Tenasserim, *Beddome* 1293 (P), *Helper* 1979 (C), *Meebold* 15167, 15363 (C); Molyet, *Gallatly* s. n., 372 (C). SIAM: *Kerr* 7689, 9295 (E). INDO-CHINA: Bienhoa, *Pierre* 837 A (see *M. pallens* Pierre, p. 294 for the Phu Quoc material placed by Pierre under this number); Lakhon, *Thorel* 3186 (Ge, E). PENANG: Tiger Hill Road, ? *Haniff* 100 (Su, UC, photo. A). CHINA: Yunnan, Che-li Hsien, *Wang* 79691 (A), Dahmeng-lung, *Wang* 76357, 77898 (A), Kuenger, *Wang* 79417 (A), Nan-hsien-ho, *Wang* 79493, 79568 (A); Hwei-chu, *Wang* 80271, 80290, 80294 (A); Lu-se, *Tsai* 56327; Szemao, *Henry* 12686 (A, N).
- On comparing the Mekong and Penang material (distinctly incomplete specimens in both cases), we note no very tangible differences between Wallich's material and the Mekong specimens. The Penang plant, however, has a different aspect, with relatively longer and narrower leaves, slenderer petioles, more delicate inflorescences, and smaller flowers. In the distinctly unsatisfactory Penang material examined, although the petals are slightly keeled inside, somewhat as in typical *M. discolor* Wall., the stamens are not attached to the bases of the petals but are apparently inserted on a vestigial disk. It may later prove to be desirable to separate the Penang form when more material is available, especially as King states that its fruit, which we have not seen, is smaller than that of the Indian plant. He describes it as subglobular, glabrous, and 0.3 in. long; that of the typical form is ellipsoid, 1 to 1.5 cm. long, and the pericarp is roughish and distinctly subfurfuraceous-lepidotulote, the latter a character that we have not seen mentioned in any formal description of the species. It holds for the Khasia, Assam, Bengal, Burma and Yunnan material, as far as fruiting specimens are available

from those regions. We feel that in all probability some forms, among the above cited specimens, especially where only incomplete material is now available, may later prove to be worthy of segregation when more complete specimens are at hand; this applies especially to the Penang form and to that of Indo-China (the form erroneously placed by some authors under *M. pallens* Pierre).

We call attention to the fact that *Microtropis discolor* Wall. is the type or standard species of the genus. It differs from most other species now placed in *Microtropis* in the entire absence of the disk, the filaments alternating with the petals, attached to and uniting their bases; in its petals being rather prominently keeled inside; and in its subfurfuraceous-lepidotulote fruits. If the presence or absence of the disk be any criterion in establishing generic limits, then strictly *Microtropis* Wallich should be limited to the few otherwise mostly very diverse species characterized by the absence of the disk (*M. discolor* Wall., *M. pallens* Pierre, *M. Scottii* Parkinson, *M. tenuis* Symington, and *M. valida* Ridley, an incongruous group). Most of the other species here retained in *Microtropis* should then be transferred to one or the other of the generic names discussed above, *Paracelastrus* Miquel, *Othodendron* Makino, and *Chingithamnus* Handel-Mazzetti; and of these *Paracelastrus* is the oldest. The disk is common to all three categories.

30. *Microtropis pallens* Pierre, Fl. Forest. Cochinch. 4: t. 305b. 1891; Pitard in Lecomte, Fl. Gén. Indo-Chine 1: 879, f. 110. 1912; Craib, Fl. Siam. Enum. 1: 281. 1926.

*Pleurostyliya pallens* Pierre l. c. in syn.

INDO-CHINA: Phu Quoc Island, *Pierre* 827 (M, P, photo. A). SIAM: Tassan Champhon, *Hamid* 3848 (M, S).

*Thorel*, Mekong Expedition (fragm. A) was cited by Craib and Pitard cites *Harmand* 963 (fragm. A) from Annam; both of these specimens we believe to represent a form of *M. discolor* Wall. Craib cites several other collections which we have not seen. *Pierre* 837 is the type, but this number consists of material from at least three different collections and from three different localities, Phu Quoc,<sup>1</sup> Feb., 1874, Mount Tamiri, Cambodia,

<sup>1</sup> Phu Quoc is an island off the southwest coast of Cambodia. Bienhoa is in Cochin-China just north of Saigon, on the southeast coast of Indo-China.

May, 1870, and Bienhoa, Sept., 1865, representing two distinctly different species.

The name *pallens* is distinctly more descriptive of the Bienhoa specimen, but as Pierre's description and his illustration of the flowering branch was clearly made from the Phu Quoc collection, it is only logical to accept this as the type. The Bienhoa specimen of *Pierre* 827, of which we have seen only sterile material, looks like a rather small leaved form of *M. discolor* Wall. and we have placed it in that category; it has but about six pairs of lateral nerves, as does Wallich's species. *M. pallens* Pierre, as we have limited the species (the Phu Quoc specimen only) is amply distinct from *M. discolor* Wall. The two sheets that we have examined have 9 or 10 pairs of lateral nerves; Pierre says 11 or 12 pairs as does Pitard. The flowers are very much smaller than are those of *M. discolor* Wall., the petals being but 2 mm. in length and not conspicuously thickened-keeled in the median portion inside as in Wallich's species. Like *M. discolor* Wall. there is no disk, the filaments being slightly attached to the bases of the petals and alternate with them.

#### Series JAPONICAE

Leaves small, coriaceous, obtuse or rounded, often pale when dry, the short cymes usually more or less glaucous; disk somewhat thickened. Japan to Formosa.

31. *Microtropis japonica* (Franch. & Sav.) Hall. f. Meded. Rijks Herb. 1910: 33. 1911, reprint. 33. 1923; Masam. Prel. Rep. Veg. Yak. 92. 1929, Mem. Fac. Sci. Agr. Taihoku Univ. 11: 280. 1934 (Fl. & Geobot. Yak. 280).
- Elaeodendron japonicum* Franch. & Sav. Enum. Pl. Jap. 2: 315. 1879; Maxim. Bull. Acad. Sci. St. Pétersb. 27: 459. 1881 (Mél. Biol. 11: 205); Ito & Matsum. Jour. Col. Sci. Univ. Tokyo 12: 375. 1899 (Tent. Fl. Lutch. 1: 107); Matsum. & Hay. op. cit. 22: 84. 1906 (Enum. Pl. Formos. 84).
- Cassine japonica* O. Kuntze, Rev. Gen. Pl. 1: 114. 1891; Loesener in Engl. & Prantl, Nat. Pflanzenfam. 3 (5): 215. 1896; Matsum. Bot. Mag. Tokyo 12: 62. 1898; Ito & Matsum. Jour. Col. Sci. Univ. Tokyo 12: 375. 1899 (Tent. Fl. Lutch. 1: 107).
- Othodendron japonicum* Makino, Bot. Mag. Tokyo 23: 62. f. 1-25. 1909; Ic.

Pl. Japon. 1: *t.* 12-14. 1911; Matsum. Ind. Pl. Jap. 2: 323. 1912; Makino & Tanaka, Man. Fl. Jap. 330. 1927; Makino & Nemoto, Fl. Jap. ed. 2, 686. 1931; Terasaki Nippon Shokob. Zuhu *f.* 36. 1933; Naito & Kaj. Wild Pl. Kag. Pref. 389. 1934.

*Cassine kotoensis* Hay. Ic. Pl. Formosa 3: 61. 1913.

*Otherodendron liukiense* Nakai, Bot. Mag. Tokyo 36: 67. 1922.

*Microtropis liukiensis* Koidz. Bot. Mag. Tokyo 40: 334. 1926.

*Microtropis kotoensis* Koidz. Bot. Mag. Tokyo 40: 334. 1926; Sasaki, Pl. Formos. 274. 1928; Makino & Nemoto, Fl. Jap. ed. 2, 686. 1931; Kanehira, Formosan Trees ed. 2, 395. 1936; Masam. Fl. Formos. 128. 1936.

JAPAN: Honshiu, Idzu, ex herb. Sakurai (A, E); Yokohama Nursery Co. (E), *Wilson* s. n. (A), Wilson 8194 (A, E); Suruga, no collector (A, P); Sagami, Mount Takatori, *Sawada* (UC); Tokyo, cult., *Kanchira* 3125 (A); Yokohama Nursery Co., cult. (E); Kyushu, Mount Kirishima, *Tashiro* (A); Yakushima, *Masamune* (N); no locality, *Franchet* 2007 (P); Riukiu Islands, Osima, *Okabo* 59 (P), no collector (P), Yokohama Nursery Co. (A), *Kanchira* 3297 (photo. A), 3422 (N), photo. of type of *Otherodendron liukiense* Nakai, herb. Tokyo (A); Formosa, Botel Tobago Island, *Sasaki* s. n. (A), photo. of type of *Otherodendron kotoense* Hay., herb. Tokyo (A).

While we admit that there are slight differences between specimens from the Riukiu Islands (*Microtropis liukiensis* Koidz.) and Honshiu (*M. japonica* Hall. f.), we have failed to note constant and dependable characters by which two species may be distinguished; and yet as late as 1931 Makino, the author of the genus *Otherodendron*, retained *O. japonicum* Mak. (*M. japonica* Hall. f.) as generically distinct from *Microtropis liukiensis*. *Microtropis kotoensis* might be distinguished on geographic grounds, with thus one northern, one central, and one southern species, but we have not detected any characters that are sufficiently consistent to permit definite separation. Except for its somewhat more slender inflorescences, *M. kotoensis* Hay. is hardly distinguishable from typical specimens of *M. japonica* from Honshiu. Although the specimens from the Riukiu Islands have a superficially different aspect, one notes that the so-called distinguishing characters, the somewhat coarser,

stiffer texture of leaves and the assumed different bark, are also found in some of the Honshiu material, and that the transition from one condition to the other is so imperceptible and intangible that we consider it to be impracticable to distinguish the two forms as separate entities.

32. *Microtropis Sakaguchiana* Koidz. Pl. Nov. Amani-Osim. 16. 1928; Makino & Nemoto, Fl. Jap. ed. 2, 686. 1931; Koidz. Act. Phytotax. Geobot. 1: 173. 1932.

RIUKIU ISLANDS: Okinawajima (Utchina), Kunchar Sade, *Sonohara* (Herb. Kyoto), (photo. A); Kunigami-gun, *R. Kanchira* 3275 (6315), Jan. 5-6, 1934 (fragm. A).

The original description was based on two collections, that of Sayuka Sonohara, March 21, 1921, and another by Z. Tashiro, Feb. 11, 1924. The species is characterized by its narrow obtuse leaves. The original description is repeated, with slight changes, in Koidzumi's 1932 paper cited above. We are under obligations to Dr. Koidzumi for his courtesy in sending an excellent photograph of the type specimen, and to Dr. R. Kanehira for a loan of his number 3275 (6315) from Kunigami-gun. The flowers are much smaller than are those of *Microtropis japonica* (Franch. & Sav.) Hallier f.

#### Series JAVANICAE

Leaves caudate-acuminate, base decurrent; cymes rather few-flowered, about as long as the petioles. Java.

33. *Microtropis javanica* sp. nov.

*Microtropis bivalvis* sensu Koord. Exkursionsfl. Java 2: 524. 1912; Koord.-Schum. Syst. Verzeich. Herb. Koord. 1 (1, 158): 3. 1912; Koord. & Val. Atlas Baumart. Java 1: *t.* 138. 1913, non Wall.

Arbor glabra circiter 15 m. alta, ramulis gracilibus, teretibus, brunneis, ultimis subcompressis, 1 mm. diametro, internodiis 6-8 cm. longis; foliis ovatis vel elliptico-ovatis 8-10 cm. longis, 3-5.5 cm. latis, graciliter caudato-acuminatis, basi decurrentibus, in sicco brunneis, utrinque concoloribus, supra nitidis, nervis primariis utrinque 4-6, arcuato-anastomosantibus, gracilibus, subtus paullo elevatis, reticulis laxis; petiolo 1.5 cm. longo; cymis axillaribus, paucifloris, dichotomis, petiolum subaequantibus, pedunculo circiter 5 mm. longo; floribus (4?) 5-meris, bracteis 1 mm. longis; sepalis inaequalibus,

exterioribus suborbicularibus, 2 mm. diametro, 3 interioribus subreniformibus, circiter 2 mm. longis et 3.5 mm. latis; petalis 1.8 mm. longis; staminibus disci margini insertis, filamentis brevibus; ovario oblongo, sulcato, 2-loculari.

JAVA: Bantam, Gunong Pulusari, *Koorders 9921* ♂ (B, photo. A), very rare, a tree about 15 m. high growing at 1250 m. altitude, June 15, 1892.

This differs radically from *Microtropis bivalvis* Wall., notably in its short peduncled cymes and in the slenderly and sharply caudate-acuminate leaves, which have a very different venation than those of Wallich's species. Dr. Boerlage's dissection notes indicate 4-5 sepals and 4-5 petals, but the illustration cited above, based wholly on this specimen, shows only 5-merous flowers, and the one dissection we made was of a 5-merous flower.

#### Series FALLACES

Leaves medium; cymes rather long-peduncled, dichotomous; disk rather closely adnate to the base of the petals. Indo-China.

#### 34. *Microtropis fallax* Pitard in Lecomte, Fl. Gén. Indo-Chine 1: 881. 1912.

INDO-CHINA: Tonkin, Lankok Valley, Mount Bavi, *Balansa 3174*, type collection (L, fragm. & photo. A); Annam, Mount Bana, *J. & M. S. Clemens 3923* (A, N, U, UC), *4250* (A, Ge, N, U, UC), May-July, 1927.

Additional material enables us to supply details of the flower structure as follows. Flowers 5-merous, the sepals unequal, thickened, their margins membranaceous; petals oblong, rounded, about 3 mm. long; anthers oblong-ovoid or ovoid-elliptic, about 1.3 mm. long, the stout short filaments borne on the margin of the 2 mm. long disk which is so closely adnate to the basal parts of the petals that it appears to be a part of them, the stamens alternating with the corolla lobes; ovary and style about 2 mm. long, the ovary narrowly conical, 2-celled.

The type, a fruiting specimen, is *Balansa 3174*, although the collection number is not given in the original and only published description, it there being indicated merely as "Tonkin — Lankok, au mont Bavi (Balansa)." We refer the two Clemens numbers here, although the leaves average smaller than in the type, and the infrutescences are somewhat shorter and with fewer fruits. The original description is somewhat misleading in that the lateral nerves are described as "nervures 16-20"; the primary ones are but

8 to 10 or at most 12 on each side of the midrib, the total number on both sides of the midrib having been counted by Pitard. Dr. H. Humbert kindly supplied us with a leaf from the holotype in the Paris Herbarium, and there is a duplicate in the Rijks Herbarium, Leiden.

#### Series ELLIPTICAE

Leaves coriaceous to chartaceous; cymes mostly greatly reduced, short-peduncled or sometimes almost sessile, the often crowded flowers subfasciculate. Malay Peninsula, Sumatra, Borneo.

#### 35. *Microtropis elliptica* King, Jour. As. Soc. Bengal 65 (2): 340. 1897 (Mater. Fl. Malay. Penin. 2: 626); Ridl. Fl. Malay Penin. 1: 444. 1922.

*Microtropis vinculans* Boerl. & Koord. in Koord.-Schum. Syst. Verzeich. Herb. Koord. 2: 33. 1911.

MALAY PENINSULA: Perak, *King's Collector 4193* (Ge, S); Pahang, *Jaamat 25179* (S); Malaya, without locality, but either from Malacca or Penang, probably the latter, *Maingay 945/2* (Gr, K); Malacca, Mount Ophir, *Ridley 3311* (S). PENANG: *Curtis 345* (S), *968* (S), *1531* (K, S), *Ridley s. n.* (S), *King's Collector 1582* (C). SUMATRA: Pang Kalan-Dule, Central Sumatra, Yzerman Expedition, *Koorders 21297* (B, photo. A), March 26, 1891, holotype of *Microtropis vinculans* Boerl. & Koord.

As King indicated no type, the first specimen cited in the original description, *Maingay 945/2*, should probably be selected. From the rather fragmentary type of the Sumatran *Microtropis vinculans* Boerl. & Koord. we see no reason for attempting to retain this as a distinct species. The leaves are an excellent match for those of King's species; the flowers on the type are all detached and immature.

#### 36. *Microtropis borneensis* sp. nov.

Frutex vel arbor parva, ad 7 m. alta, glabra, ramis teretibus, brunneis vel pallide brunneis, ramulis 1.5-2 mm. diametro, subcompressis vel sulcatis, vix angulatis, internodiis 1.5-7 cm. longis; foliis coriaceis, rigidis, ellipticis, oblongo-ellipticis vel subovatis, 6-13 cm. longis, 3-5 cm. latis, margine plerumque leviter revolutis, breviter, plerumque subabrupte acute acuminatis, basi acutis vel decurrentibus, sicco supra subopacis, olivaceis vel pallide olivaceis, subtus plerumque brunneis; nervis primariis utrinque 6-8, arcuato-



anastomosantibus, supra haud perspicuis, leviter elevatis vel interdum subobsoletis, subtus magis distinctioribus, elevatis, reticulis laxis; petiolo circiter 5 mm. longo, canaliculato; cymis axillaribus, brevibus, vix 1 cm. longis, breviter pedunculatis (pedunculo 2–5 mm. longo), plerumque 3- vel 6- floris, floribus confertis, subcapitatis, sessilibus vel brevissime (vix 1 mm.) pedicellatis, 5-meris; bracteis bracteolisque ovatis, acuminatis, circiter 2 mm. longis; sepalis suborbicularibus, 2–2.5 mm. diametro, rotundatis, margine tenuioribus, sublaceratis fimbriatisque; petalis maturis non visis; filamentis (in alabastro) brevibus, disci margini insertis; ovario anguste ovoideo, sursum angustato, 2-loculari, stigmatibus brevibus, 2- vel 4-lobatis; fructibus oblongo-obovoides, in sicco brunneis, 2 cm. longis, 1 cm. diametro, breviter crasse apiculatis, sepalis persistentibus ad 3 mm. longis.

BORNEO: British North Borneo, Mount Kinabalu, *Griswold* 11 (A), June 12, 1937, *Clemens* 11077 (A, M), December, 1915, 29512 (A, B, Ge, L), 27850 (B, UC), 29734 (B, L, N), 31434 (A, B, L, N), 31742 (A, holotype; B, Ge, N, UC), 31801 (A, B, L, N, UC), 32471 (A, B, L, N, UC), 32507 (A, B, N). These numerous *Clemens* collections were made at various localities on Mount Kinabalu, Lumu, Marai Parai, Penibukan, Tenompok, and the Kina Taki, Colombon, and Panataran Rivers, January to June, 1932, and February to June, 1933, at altitudes from 1500 to 2400 m., but in spite of the abundant material examined, 34 sheets in all, none of the specimens examined have mature flowers.

The species is characterized by its rigid, coriaceous, shortly acuminate leaves which are usually dark reddish brown beneath, short petioles, and by its very shortly peduncled, normally 3- or 6-flowered short cymes which do not exceed 1 cm. in length, the sessile or very shortly pedicelled flowers being subcapitate in arrangement. Its closest alliance seems to be with *M. ophirensis* Ridl. of the Malay Peninsula.

37. ***Microtropis ophirensis*** Ridl. Jour. Roy. As. Soc. Straits Branch 35: 10. 1901, Fl. Malay Penin. 1: 444. 1922.

MALAY PENINSULA: Malacca, Gunong Mering and Gunong Ledang, Mount Ophir, *Ridley* s. n. (S, photos. A). two collections June 6 and 9, 1892, holotype.

This is closely allied to *M. elliptica* King, but may be retained as distinct. The Gunong Ledang specimen has very short inflorescences

about 5 mm. long, but in the Gunong Mering one they are up to 2 or 2.5 cm. in length. The leaves on the two are the same. In the note following the original description Ridley speaks of a form with longer leaves up to 4 inches long, but does not include it in his description. The largest leaves on the type specimen are 8 by 3.5 cm.

38. ***Microtropis rigida*** Ridl. Kew Bull. 36. 1931.

BORNEO: Sarawak, Mount Santubong, *Native Collector* (Bur. Sci.) 2223 (A, M); Mount Matang, J. & M. S. *Clemens* 7794 (N, photo. A), Oct. 28, 1929, on forested ridges, altitude about 550 m.; without locality, *Beccari* 1702, type (K, photo. A).

Characterized by its coriaceous very short-petioled or even subsessile leaves which are narrowed below to the abruptly obtuse or rounded or even slightly cordate base, their margins rather prominently revolute, the latter character not mentioned in the original description.

39. ***Microtropis ovata*** sp. nov.

Frutex circiter 3 m. altus, glaber, ramis teretibus, rigidis, laevibus, subcastaneis, ramulis acute 4-angulatis, 3 mm. diametro, internodiis 3–9 cm. longis; foliis breviter petiolatis vel subsessilibus, crasse coriaceis, rigidis, in sicco utrinque brunneis vel supra olivaceo-brunneis, subopacis vel obscure nitidis, ovatis, late acutis, basi late truncato-rotundatis vel obscure cordatis, 7–10 cm. longis, 5–7 cm. latis, margine plerumque revolutis; nervis primariis utrinque 7–9, distinctis, subtus elevatis, perspicue arcuato-anastomosantibus, reticulis laxis, leviter elevatis; petiolo crasso, 3–4 mm. diametro, minute rugoso, ad 2.5 mm. longo; cymis axillaribus, brevibus, 0.5–1 cm. longis, in sicco castaneis, breviter crasseque pedunculatis, confertis; floribus 5-meris, in sicco castaneis; sepalis late ovatis, circiter 2 mm. diametro, coriaceis; petalis oblongo-ovatis, rotundatis, 2.3 mm. longis; staminibus brevibus, disci margini insertis; ovario ovoideo, 1-loculari.

BORNEO: British North Borneo, Mount Kinabalu, Colombon Basin, Numeruk Ridge, *Clemens* 40046 (A, holotype, B, L, N); Marai Parai Spur, *Clemens* 32592 (B, N). The collections were made on April 4 and August 18, 1933, described as a small shrub, about 8 feet high, altitude 1200 to 1500 m.

A very strongly characterized species, readily recognizable by its very shortly petioled, ovate, rigid, thickly coriaceous, broadly acute leaves which are more or less castaneous when dry,

broadly rounded-truncate or slightly cordate at the base, and by its short crowded cymes, which, although distinctly but shortly peduncled, simulate glomerules.

#### Series BICOLORES

Leaves fairly ample, dark-colored above and very pale brownish beneath when dry; fruit in a terminal fascicle. Borneo.

#### 40. *Microtropis bicolor* sp. nov.

Frutex vel arbor parva, glabra, ramulis teretibus, obscure striatis, 3 mm. diametro, internodiis circiter 8 cm. longis; foliis subcoriaceis, late lanceolatis vel oblongis, 15–20 cm. longis, 4–6 cm. latis, distincte acuminatis, basi cuneatis, in sicco supra subatro-olivaceis, subopacis, subtus pallide brunneis, nervis primariis utrinque circiter 10, rectis, arcuato-anastomosantibus, quam secundaria magis distinctioribus, reticulis ultimis utrinque paullo elevatis; inflorescentiis terminalibus, glomeratis, ut videtur paucifloris (floribus ignotis); sepalis persistentibus 4, subcoriaceis, rugosis, margine pallidis, erosis; fructibus sessilibus, oblongo-ellipsoideis, acutis, 1.5 cm. longis, circiter 1 cm. diametro, pericarpio sicco atro-brunneo, laevi.

BORNEO: Sarawak, *Beccari 2617* (K, photo. A).

Readily recognized among the large leaved Malaysian species by its flowers being in terminal apparently sessile glomerules, the sessile fruits being about 1.5 cm. long. The upper and lower surfaces of the rather closely reticulated leaves are strikingly different in color, the upper surface being dark olivaceous, the lower pale brown when dry.

#### Series GAGEANAE

Leaves medium, chartaceous, very broadly and obtusely blunt-acuminate or merely obtuse, prominently nerved, the nerves curved-anastomosing very close to the margin. Burma.

#### 41. *Microtropis Gagei* sp. nov.

Frutex vel arbor parva, glabra, ramis gracilibus, teretibus, rubro-brunneis, ramulis pallidioribus, obscure sulcatis, circiter 1.5 mm. diametro, internodiis 4–5 cm. longis; foliis chartaceis, plerumque oblongo-ovatis, 9–12 cm. longis, 4–6 cm. latis, utrinque subnitidis, supra olivaceis, subtus pallidis, subglaucis, apice brevissime late obtuseque acuminatis, basi late acutis vel subrotundatis, nervis primariis utrinque 8–10, juxta marginem curvato-anastomosantibus, subtus ele-

vatis, perspicuis, secundariis reticulisque gracilibus, paullo elevatis, supra minus distinctis, leviter elevatis; petiolo canaliculato, 7–9 mm. longo; inflorescentiis axillaribus, breviter pedunculatis, ut videtur paucifloris, sub fructu pedunculo crasso vix 2 mm. longo; fructibus ut videtur solitariis, anguste oblongo-obovoideis, obtusis, 1.6–1.8 cm. longis, pericarpio sicco subcastaneo, tenuissime longitudinaliter striato; sepalis persistentibus ut videtur 5; floribus ignotis.

BURMA: Tavoy, ridge between Kyong Pyu Chaung and the Talaingya head stream, *Col. A. T. Gage 37* (C, holotype), February 3, 1919, altitude about 450 m.

Although flowers are unknown, this form is so markedly distinct from the other material we have studied that we unhesitatingly describe it as new. It is well characterized by its very short inflorescences (these in fruit bearing a solitary, very shortly peduncled capsule), and its chartaceous, slightly shining, shortly, broadly, and bluntly acuminate leaves, olivaceous above and subglaucous beneath, the primary nerves elevated and prominent on the lower surface, curved-anastomosing close to the margin.

#### Series PACHYPHYLLAE

Leaves coriaceous, verruculose when dry, the short lateral cymes distinctly pedunculate. Siam, Burma.

#### 42. *Microtropis pachyphylla* sp. nov.

Frutex glaber, ad 3 m. altus, ramis teretibus, ramulis ultimis circiter 2 mm. diametro; foliis in sicco pallidis, rigidis, rugulosis, utrinque concoloribus vel subtus paullo pallidioribus, oblongis vel oblongo-ellipticis, nitidis vel subopacis, 8–14 cm. longis, 3–5.5 cm. latis, obtusis vel late acutis vel obscure latissime obtuse acuminatis, basi acutis, margine revolutis; nervis primariis utrinque 4–6, haud perspicuis, arcuato-anastomosantibus, interdum obsolete vel subobsoletis, secundariis obsolete; petiolo crasso, canaliculato, 1–1.5 cm. longo; cymis lateralibus, in ramis ramulisque infra foliis, 3.5–6 cm. longis, dichotomis, rigidis, 3–5 cm. latis, pedunculis 1.5–3 cm. longis, ramis primariis plerumque 1–1.5 cm. longis, divaricatis, dichotomis, secundariis 4–6 mm. longis, floribus in ramulis ultimis plerumque binis, sessilibus vel brevissime pedicellatis; floribus albidis, 5-meris, circiter 4 mm. longis; sepalis inaequalibus, binis exterioribus suborbicularibus, circiter 1 mm. diametro, interioribus subreniformibus, 1.5 mm.

longis, 2-2.5 mm. latis; petalis oblongo-obovatis, rotundatis, subconcavis vel subcuculatis, 3.5-4 mm. longis, 2.5 mm. latis; antheris ovoideis, 1.2 mm. longis, filamentis brevibus, crassis, disci margini insertis; ovario anguste ovoideo, 2-loculari.

BURMA: Yatheytaung, Theton District, 6553, *Mg-Po-Chin*, Forest Ranger, type, March 24, 1928 (C, photo. A), a small tree in rocky places, alt. 730 m., flowers white; Amherst District, Dawna Range, *Burkill* 30313 (C), a small bush with white flowers, alt. about 900 m., March 3, 1908, without locality *Brandis*, ex herb. S. Kurz (C, photo. A).

This form, all specimens originally identified as representing *Microtropis longifolia* Wall., is characterized by its coriaceous, obscurely nerved, pale, verruculose leaves, and differs from *Wallich* 4339, the type of *Microtropis longifolia* Wall. ex Kurz in its very much longer, many flowered, much longer peduncled cymes, those of *M. longifolia* Wall. ex Kurz (in fruit) not exceeding the petioles in length. Although in his original description of Wallich's species, Jour. As. Soc. Bengal 42 (2): 65. 1873, Kurz cites only "Wall. 4339 (pro parte)" he mentions the short cymes with peduncles 4 to 6 lines long, and describes the fruits, we feel confident that the form above described with rather lax cymes much exceeding the petioles in length and with peduncles 1.5 to 3.5 cm. long should not be placed in the same category as *Wallich* 4339, a fruiting specimen, its short peduncled fruiting cymes scarcely equalling or only slightly exceeding the petioles.

43. *Microtropis longifolia* Wall. List no. 4339, 1830, *nomen nudum*, Kurz, Jour. As. Soc. Bengal 42 (2): 65. 1873, *descr.*, For. Fl. Brit. Burma 1: 250. 1877.

BURMA: Tavoy, *Wallich* 4339 (col. Gomez) (C holotype, photo. and drawing A).

We are constrained to limit this species, for the present, to the type collection, *Wallich* 4339, with its holotype in the Calcutta Herbarium. Kurz's Latin description of 1873, based on "Wall. 4339 (pro parte)" and his English one of 1877, appertain to the form here considered and the Wallich specimen in the Calcutta herbarium was the source of his specific name. Other material named at Calcutta as representing *Microtropis longifolia* Wall. we place under *M. pachyphylla* Merr. & Freem., supra. Wallich's species is characterized by its elliptic to oblong-elliptic, coriaceous, verruculose, fairly ample, few nerved

leaves and its short infructescences which scarcely equal or but slightly exceed the petioles in length. There has been some confusion regarding the species because the Kew sheet, of which we have an excellent photograph, has mounted with it a specimen of *Salacia macrophylla* Wall. (supposedly = *S. flavescens* Kurz), which, however, has its own label "(303) 1584, tree. Tavoy, 2nd October, 1827." This accounts for the Index Kewensis entry "*longifolia*, Wall. Cat. n. 4339 = *latifolia*, *Salacia flavescens*." The mixture was not in the collection but was due to an error in mounting two independent collections on the same sheet.

We have seen no specimen of *Wallich* 4339, our interpretation being based on Kurz's short description and a drawing of the sheet of Wallich's specimen in the Calcutta Herbarium. Mr. Airy-Shaw, who examined the material at Kew, states that he has no doubt as to its representing *Salacia flavescens* Kurz. It may be that the actual specimen in the Calcutta Herbarium represents the *Salacia*; it is a leafy branch with a single detached fruit. In such case *Microtropis longifolia* Wall. would be eliminated from the genus.

#### 44. *Microtropis macrophylla* sp. nov.

Frutex vel arbor parva, glabra, ramulis teretibus, brunneis, 3-4 mm. diametro, internodiis circiter 8 cm. longis; foliis oblongo-ellipticis, in sicco brunneo-olivaceis, utrinque subconcoloribus vel subtus paullo pallidioribus, verruculosus, obscure nitidis, plus minusve acuminatis, basi acutis, 20-23 cm. longis, 7-8 cm. latis, nervis primariis utrinque 6-7, haud perspicuis, subadscedentibus, subtus obscure arcuato-anastomosantibus, secundariis obsoletis vel subobsoletis; petiolo 1.5-1.8 cm. longo, 3 mm. crasso; cymis solitariis vel fasciculatis ad nodos foliatis, circiter 3 cm. longis, dichotomis, pedunculo 1-1.5 cm. longo, ramis primariis patulis, vix 1 cm. longis, dichotomis; floribus 5-meris, circiter 4 mm. longis; sepalis subreniformibus, subaequalibus, latissime rotundatis, minute denticulato-erosis, 1 mm. longis, 1.5 mm. latis; petalis oblongis, rotundatis, 3 mm. longis, 1.5 mm. latis; filamentis gracilibus, circiter 1.2 mm. longis, disci margini insertis, antheris brevibus, 0.4 mm. longis; ovario conico, 1-loculari.

BURMA: Kachin Hills, *Captain S. M. Toppin*, s. n., type (K, photo. A), without notes.

Although the specimen is somewhat inadequate, we have not been able to match it among the

rather abundant material at our disposal. The species seems clearly to be allied to *Microtropis longifolia* Wall., having even larger leaves than that species, and with more numerous lateral nerves. It differs further in its much larger, longer peduncled cymes.

#### Series FILIFORMES

Leaves medium to ample, mostly chartaceous; cymes mostly open, twice to several times dichotomous, mostly many flowered, on slender, filiform, often greatly elongated peduncles. Burma, Siam, Malay Peninsula, Penang, Sumatra.

45. *Microtropis filiformis* (Wall.) King, Jour. As. Soc. Bengal **65** (2): 342. 1896 (Mater. Fl. Malay Penin. **2**: 628); Ridl. Fl. Malay. Penin. **1**: 444. 1922.

*Euonymus filiformis* Wall. List no. 4295. 1830, *nomen nudum*.

MALAY PENINSULA: Perak, *Wray 435* (S, K), *King's collector 2025* (K); Kedah, *Ridley s. n.* (S); Langat, *Ridley 312* (S); Selangor, Sungei Buloh Reserve, *Jaamat 13844* (S), *Symington 22298* (S); Dindings, *Ridley s. n.* (S); Kelantan, *Symington 37643* (S). PENANG: *Wallich 4295* (Ge, K, photo. A), *Curtis s. n.* (S), *Forest Guard 12718* (S). SUMATRA: Asahan, *Rahmat 7613* (A), *7886* (A); Hoeta Padang, *Krukoff 4427* (A, B, Ge, L, M, N); Koaeloe, *Bartlett 7653* (N). Without locality or collector (probably from Penang or the Malay Peninsula) sheet 899, 175-304 (L) "a small plant, name unknown, from the hills, gathered in August, 1824."

In the typical form the flowers are small, up to 3 mm. long, while the leaves usually have from 10 to 12 pairs of lateral nerves. The Sumatra specimens have somewhat shorter and thicker fruits than those of the Malay Peninsula, but the specimens otherwise so closely match those of the Peninsula and Penang that we are convinced that a single species is represented. We have seen no typical *Microtropis filiformis* King material from outside of the Malay Peninsula, Penang, and Sumatra. This species was included by Lawson in Hook. f. Fl. Brit. Ind. **1**: 614. 1875, and by Kurz, For. Fl. Brit. Burma **1**: 251. 1877, in *Microtropis bivalvis* Wall., probably through the erroneous reduction of *Euonymus* ? *lacta* Wall. to the synonymy; see *Euonymus bivalvis* Wall. var. *lacta* (Wall.) p. 301. We are confident that Sir George King was correct in maintaining it as distinct.

A Burma form, characterized by its distinctly larger flowers, which may ultimately best be considered as a distinct species, is:

- 45a. *Microtropis filiformis* (Wall.) King, var. *grandiflora* var. nov.

*Microtropis filiformis* sensu Fischer, Kew Bull. 27. 1931, vix King.

A typo differt floribus majoribus 4.5-5 mm. longis. Foliis chartaceis, 10-19 cm. longis, 5-8.5 cm. latis, nervis primariis utrinque circiter 10; pedunculo 3.5-4 cm. longo.

BURMA: Amherst District, Kyain, *F. G. Dickason 6889* (A, type), February, 1938, a shrub about 3 m. high, flowers yellow, on rocky hills; Pegu, Salu Reserve, *Lace 6069* (C, E), a small tree, alt. 75 m., flowers white, fragrant; Mergui, Victoria Point, *Parker 3154* (A), January 29, 1930, a shrub, flowers yellowish-green, and same locality, collector's name illegible, *6292* (C), Dec. 1, 1928, a small tree, alt. about 150 m., flowers whitish.

Superficially the flowers of this variety strongly resemble those of *Microtropis discolor* Wall., but the disk is present, the petals are not keeled inside, and the slenderly, rather long peduncled, many-flowered cymes are very different. Whether considered as a variety, or perhaps eventually as a distinct species, its true alliance is clearly with *M. filiformis* (Wall.) King and not at all with *M. discolor* Wall.

The Siam material referred to *Microtropis filiformis* King by Craib, Fl. Siam. Enum. **1**: 281. 1926, which we have not seen, may represent the above variety or may possibly be referable to *Microtropis bivalvis* (Jack) Wall. var. *lacta* (Wall.) Merr. & Freeman.

46. *Microtropis peduncularis* Ridl. Kew Bull. 262. 1924, Fl. Mal. Pen. **5**: 298. 1925, Craib, Fl. Siam Enum. **1**: 282. 1926.

SIAM: Kasum, Khaw Pak Hill, *Haniff & Nur 3842* (M, S, photo. A). MALAY PENINSULA: Kedah, Alor Station, *Ridley 15104* (S); Selangor, Sungei Buluh, *Ridley 13358* (S); Perak, Maxwell's Hill, *Ridley s. n.* (S); Ulu Bubong, *King's Collector 10370* (K, photo. A, type); Langkawi, Gunong Raya, *Haniff*, Feb. 1911 (S).

This species is manifestly very closely allied to *M. filiformis* King, differing in its shorter inflorescences which are usually terminal rather than lateral. In the original description Ridley cites "Perak, Ulu Bubong—Kunstler," but the Ulu Bubong sheet that he wrote up at Kew is *King's Collector 10370*.



47. *Microtropis bivalvis* (Jack) Wall. List no. 4340. 1830; Ettingsh. Denkschr. Akad. Wiss. Wien Math.-Nat. Classe 13: 64. f. 13, t. 4. f. 11. 1857, Blatt-Skel. Dikot. 154. t. 63. f. 18. 1861; Lawson in Hook. f. Fl. Brit. Ind. 1: 614. 1875, pro parte; King, Jour. As. Soc. Bengal 65: (2): 341. 1896 (Mater. Fl. Malay. Penin. 2: 627); Ridl. Fl. Malay. Penin. 1: 444. 1922.

*Celastrus* ? *bivalvis* Jack, Mal. Misc. 1 (5): 19. 1820; Roxb. Fl. Ind. 2: 399. 1824; Hook. Bot. Miscel. 2: 71. 1831; Misc. Pap. Indo-Ch. Ind. Arch. II. 2: 233. 1837 (reprints of orig. descr.).

*Paracelastrus bivalvis* Miq. Fl. Ind. Bat. 1 (2): 591. 1859; F. N. Will. Bull. Herb. Boiss. II. 5: 224. 1905.

? *Euonymus capillaceus* Wall. List. no. 7270. 1832, *nomen nudum* (fide Lawson).

PENANG: Wallich 4340 (photo. A, E, Ge, Gr, L, N, P), Maingay 392-2 (Gr, L), Haniff 246 (N, Su).

We have seen no material from outside of Penang that we feel can safely be referred to this species. King surmised that the plant issued by Wallich as *Microtropis bivalvis* Wall. (for which Wallich cites the synonym *Celastrus* ? *bivalvis* Jack), was not the plant described by Jack because the latter indicated his species as apetalous, which later led Miquel to propose the new generic name *Paracelastrus* for this particular species. However, it should be noted that Wallich 4340 is made up of material collected in Penang by Porter and by Jack, and Jack himself speaks of sending specimens of his *Celastrus bivalvis* to Wallich. King surmised that the Penang plant named by Wallich as *Euonymus capillaceus* Wall. might have been the "lost" *Celastrus bivalvis* of Jack, but we see no warrant for this assumption. It is reasonably safe to assume that this Wallich number 4340 does represent the type collection of *Celastrus* ? *bivalvis* Jack (see p. 272), and that Jack described his species from specimens with fallen petals. Lawson gave the distribution of the species as from Tenasserim to Penang, Malacca, Sumatra, and Java, which is manifestly wrong. King confined it to Penang and Malacca, the latter locality entered on the basis of a Maingay specimen; but Maingay's specimen undoubtedly came from Penang rather than from Malacca, and Ridley was doubtlessly correct in limiting the species to Penang. We are not at all certain that *Euonymus capillaceus* Wall. from Penang, is correctly placed as a synonym of this species, although this is Lawson's disposition of it. No

description was ever published and we have not seen a specimen. We judge, from King's statement, Jour. As. Soc. Bengal 65 (2): 342. 1896 (Mater. Fl. Malay. Penin. 2: 628) in his discussion of *Microtropis bivalvis* Wall., that he thought that some other species was represented, but the specimen that he had for examination lacked both flowers and fruits.

- 47a. *Microtropis bivalvis* (Jack) Wall. var. *laeta* (Wall.) comb. nov.

*Euonymus* ? *laeta* Wall. List no. 4294. 1830, *nomen nudum*.

*Microtropis bivalvis* sensu Kurz, For. Fl. Brit. Burma 1: 251. 1877, non Wall.

BURMA: Tenasserim, Helfer 1930 (Gr, K, L, P, photo. A), Bot. Surv. 334 (E); Tavoy, Wallich 4294 (photo. of Kew sheet A, type collection), For. Dept. 1713 (A), 385 (C); Mergui, Griffith 849 (Gr, K).

This very closely resembles *Microtropis bivalvis* (Jack) Wall. in vegetative characters and in its slender peduncles, differing mainly in its many flowered cymes, those of typical *M. bivalvis* (Jack) Wall. apparently being but 5-flowered. In other respects it resembles *Microtropis filiformis* (Wall.) King, and was included in that species by Lawson and by King, thus explaining the Burma range of the latter species as indicated by them. It has the fewer-nerved and smaller leaves resembling those of *M. bivalvis* (Jack) Wall., while its peduncles, in length, approximate those of the latter species, those of *M. filiformis* (Wall.) King being much longer.

#### Series SCOTTIANAE

Leaves medium. Cymes long and slenderly peduncled, thrice dichotomous, nearly as long as the leaves, one large nearly sessile flower in each fork, the ultimate branches with one central sessile or subsessile flower and two lateral slenderly pedicelled ones; flowers large, the petals reflexed. Burma.

48. *Microtropis Scottii* Parkins, Repert. Sp. Nov. 29: 104. 1931.

BURMA: Tenasserim, Myinmolekat, Parker 3127 (K, photo. A), alt. 1950 m., type collection.

Striking characters of this species are its very slender, lax, thrice dichotomous inflorescences which approximate the leaves in length, a sessile or shortly and stoutly pedicelled solitary flower in each fork, the ultimate branching a triad with

one subsessile and two slenderly pedicelled flowers. The relatively large reflexed petals are unusual in the genus. Parker describes this as having no disk, but as having the filaments shortly united below. The ovary is 1-celled. This species has the largest flowers of any known representative of the genus.

#### Series CONFERTIFLORAE

Leaves rather small, the peduncles slender, elongated, the flowers subcapitately crowded; younger parts and inflorescences often with few, widely scattered, stiff, short hairs. China.

49. *Microtropis gracilipes* Merr. & Metc.  
Lingnan Sci. Jour. 16: 88. f. 6. 1937.

*Microtropis gracilipes* var. *parvifolia* Merr. & Metc. l. c.

CHINA: Kwangtung, Yam Na Shan, Mei (Kaying) District, Tsang 21425 (A, N), 21488 (A, N); Tai Mo Shan, Tapu District, Tsang 21195, type (A, N).

The description of the species was based on Tsang 21195 and 21425, and, superficially, this larger-leaved form does seem to be quite distinct from the smaller leaved one, characterized as *M. gracilipes* var. *parvifolia*. However, the leaf-size varies enough on individual specimens (see Tsang 21425) to cause us to believe that the differences in leaf-size scarcely warrant recognition of the variety.

As in *M. confertiflora* Merr. & Freem. here also (see Tsang 21195) we find a sparingly pubescent condition on the youngest branchlets, inflorescences, and petioles. The other specimens are strictly glabrous, yet there is no doubt that they represent the same species as the type. This species is distinguished from its close ally, *M. confertiflora*, in its more slender habit, smaller flowers, and proportionately longer peduncles, as well as by its smaller leaves.

50. *Microtropis confertiflora* sp. nov.

Frutex 4-7 m. altus, glaber, vel ramulis obscurissime breviter consperse rigide pubescentibus, ramis teretibus, plerumque, purpureo-brunneis, ramulis plus minusve 4-angulatis vel sulcatis, 1-1.5 mm. diametro, internodiis 1.5-7 cm. longis; foliis oblongis vel oblongo-lanceolatis, chartaceis vel subcoriaceis, in sicco subnitidis, plerumque viridibus, interdum subolivaceis vel subbrunneis, subtus plerumque paullo pallidioribus, 6-13 cm. longis, 1.5-4.5 cm. latis, utrinque

subaequaliter angustatis, perspicue acuminatis, basi cuneatis, raro late acutis; nervis primariis utrinque 7-10, gracilibus, utrinque cum secundariis reticulisque leviter elevatis, haud prominentibus; petiolo 5-15 mm. longo; cymis axillaribus extra-axillaribusque, distincte pedunculatis, solitariis, sub anthesi 1-3 cm. longis, plerumque dichotomis, ramis primariis brevibus, 1-3 mm. longis, floribus subcapitatum confertis, capitulis circiter 1 cm. diametro, pedunculo 1-2 cm. longo; floribus omnibus sessilibus, 5-meris, circiter 5 mm. longis, bracteis 1 mm. longis, ovatis, acutis; sepalis inaequalibus, orbiculari-reniformibus, margine breviter fimbriatis, binis exterioribus 2 mm. longis, 2.5 mm. latis, interioribus 2.5 mm. longis, 3.5 mm. latis, omnibus latissime rotundatis; petalis circiter 4.5 mm. longis, distincte stipitatis, ellipticis vel obovato-ellipticis, rotundatis; staminibus 2 mm. longis, filamentis margini disci insertis; ovario ovoideo, sursum angustato, subrostrato, 2-loculari; fructibus oblongo-ovoideis, circiter 1 cm. longis, rostrato-acuminatis, pericarpio longitudinaliter striato, junioribus interdum subfalcatis.

CHINA: Kwangtung, Lok Chong District, N. K. Chun 42518 (A), type, Jan. 13, 1931, a shrub near streams, flowers white; Tai Tung, S. P. Ko 51885 (A), C. L. Tso 21122 (A, N), 7 m. high, in forests, N. K. Chun 42964 (A), near streams, S. P. Ko 51153 (A), in forests; Tsing Yuen District, Y. F. Chun 30685 (A), in ravines; Ying Tak District, Wan Tong Shan, H. Y. Liang 61321 (A, Su), 61437 (A), a small tree in woods; Yu-Yuen District, Tai Ling, S. P. Ko 53523 (A), a shrub in forests, flowers white, S. K. Lau 25305 (A), in forested ravines: Kwangsi, Ping Nan District, C. Wang 40355 (A), small shrub in dense forests; Tseung District, Yao-shan, Kwangsi Museum 764 (Su), 7-8 feet high, near streams, C. Wang 39593, 40124 (A), shrub in dense forests; Shap Man Taai Shan, W. T. Tsang 22639 (A); without locality, C. Wang 39593, 40124 (A), T. S. Tsoong 83555 (A); Kweichow, Sanhoa, Y. Tsiang 6268 (N, Su), in dense forests, alt. 700 m.

This is a very strongly marked species, distinguished among other characters by its slenderly peduncled, subcapitate cymes, the sessile rather large flowers being subcapitately crowded, yet the cymes are essentially dichotomous, as there are usually two very short branches. The rather obscure, stiff, short, scattered hairs on some of the younger branchlets and occasionally on the petioles and peduncles suggests *Microtropis gracilipes* Merr. & Metcalf, which it resembles in

certain other characters, yet the two are clearly distinct. Still another unusual character is the distinctly clawed petals. Many specimens were received from Professor Chun under an unpublished binomial proposed by him. Normally this would have been accepted, but was deliberately abandoned in order to avoid possible confusion, because Ridley had already published *Microtropis peduncularis* for a Malay Peninsula species, and Chun's proposed name differed only in the terminal syllable.

#### Series CHARTACEAE

Leaves mostly large, the inflorescences of dichotomous cymes (except *M. fasciculata*); fruits as far as known, rostrate. Malay Peninsula, Sumatra, Philippines.

#### 51. *Microtropis longirostris* sp. nov.

Arbor parva, glabra, ramis teretibus, laevibus, brunneis, ramulis ultimis teretibus vel novellis subcompressis, 2-2.5 mm. diametro, internodiis circiter 6 cm. longis; foliis ellipticis, abrupte acutaeque acuminatis, acumine 1.5 cm. longo, rectis vel subfalcatis, 17-22 cm. longis, 8-10 cm. latis, basi late acutis vel leviter decurrentibus, in sicco supra leviter nitidis, olivaceis, subtus opacis, brunneis; nervis primariis utrinque 7-10, supra obscuris, subtus distinctis; petiolo 0.5-1.5 cm. longo, rugoso, 2 mm. crasso; cymis extra-axillaribus in ramulis ultimis vel lateralibus in ramis vetustioribus, plerumque solitariis, paucifloris, 2-2.5 cm. longis, pedunculo 0.5-1.5 cm. longo; floribus 5-meris, bracteis circiter 1 mm. longis; sepalis suborbiculari-reniformibus, 1 mm. longis; petalis oblongis, rotundato-obtusis, 3 mm. longis; staminibus margini disci insertis; ovario 2.5 mm. longo, 4-sulcato, 2-loculari; fructibus (cum rostro) 3 cm. longis 8-10 mm. crassis ellipticis, pericarpio minute ruguloso, obscure striato, brunneo, rostro gracili, 10-12 mm. longo.

MALAY PENINSULA: Pahang, Camp 4, Cameron's Highlands, *Henderson 11211*, type (S, photo. A); Kemanan, Ulu Bendong, Kajang, *Corner 30103* (S, photo. A), a small tree, alt. 1200-1400 m.

Among the very large leaved forms this species is immediately distinguished by its slenderly long-beaked capsule. Its general alliance seems to be with *M. elliptica* King but it is distinguished not only by its very different fruits and inflorescences, but also by its very much larger leaves.

#### 52. *Microtropis chartacea* sp. nov.

Frutex glaber, circiter 1 m. altus, ramis ramisque pallide brunneis, teretibus, vel novellis obscure subcompressis, ultimis 2 mm. diametro, internodiis 10 cm. longis; foliis tenuiter chartaceis, ellipticis vel oblongo-ellipticis, obtuse subabrupte acuminatis, basi acutis vel decurrentibus, 13-20 cm. longis, 5-9 cm. latis, in sicco supra olivaceis, subtus pallide brunneis; nervis primariis utrinque 8-10, gracilibus, utrinque distinctis, arcuato-anastomosantibus; petiolo 1.5-2 cm. longo; cymis axillaribus, solitariis, paucifloris, circiter 1 cm. longis, pedunculo 2-5 mm. longo; floribus 5-meris, sepalis persistentibus, rotundatis, chartaceis, brunneis, margine erosis; fructibus oblongo-ellipsoideis, 2-2.5 cm. longis, circiter 1 cm. diametro, rostrato-acuminatis, in sicco atro-brunneis, laevibus.

PHILIPPINES: Luzon, Camarines Sur Province, Sarapan and Kamagong, on dry forested slopes, altitude about 400 m., *Edaño 75880, 76174* (N, M, photo. A), on forested slopes, altitude about 500 m.

The alliance of this species is apparently with *M. philippinensis* Merr. Flowers are not available.

#### 53. *Microtropis fasciculata* Quis. & Merr. Philip. Jour. Sci. 37: 162. 1928.

PHILIPPINES: Panay, *Edaño 46147* (A, N, U, UC, photo. A).

In vegetative and fruit characters very similar to *Microtropis rostrata* Merr. The fruits are, however, strictly fasciculate, the fascicles borne on the trunk and larger branches.

#### 54. *Microtropis pauciflora* Boerlage in herb., sp. nov.

Frutex vel arbor parva, glabra, inter species cum foliis majoribus, ramis teretibus brunneis vel rubro-brunneis, ultimis circiter 2 mm. diametro, internodiis 5-10 cm. longis; foliis oblongo-ellipticis, chartaceis, pallide olivaceis, utrinque nitidis, subtus paullo pallidioribus, 14-28 cm. longis, 5-10 cm. latis, apice perspicue subabrupte acuminatis, basi late acutis, nervis primariis utrinque 12-14, quam secundaria vix magis distinctioribus; petiolo 1.5-2 cm. longo; cymis brevibus, paucifloris, simplicibus, axillaribus, solitariis, circiter 0.5 cm. longis, pedunculis sub anthesi vix 5 mm. longis, sub fructu usque ad 1 cm. longis; floribus 5-meris; sepalis suborbicularibus, circiter 2.5 cm. diametro; petalis late

ovatis, rotundatis; ovario cylindrico, 2-loculari; fructibus in sicco atrobrunneis, anguste ovoideis, breviter apiculatis, circiter 1.5 cm. longis.

SUMATRA: without locality, *Korthals* s. n. (A, B, L, type), the several sheets in the Rijks Herbarium all entered under no. 201580.

The material consists largely of branchlets and leaves, most of the specimens being sterile. In vegetative characters they are similar to *Microtropis sumatrana* Merr., but the short, few-flowered, simple cyme seems to be characteristic.

55. *Microtropis sumatrana* Merr. Pap. Michigan Acad. 19: 164. t. 26 (1933) 1934.

SUMATRA: East Coast, Marbau, Bilah, near Bilah Pertama, *Rahmat* 214, type, 375 (not 275) (A, N); West Coast, Simaloer Island, *Achmad* 34 (B), 97 (B), 185 (B, L, photo. A), 704 (B, L), 1222 (B, L, photo. A), 1528 (B, L, M); Batoe Island, *Raap* 695 (B); no collector or locality indicated, *Hort. Bogor.* 149 (L).

The description and illustration indicate 8 or 9 primary nerves on each side of the midrib; but some of the Rahmat material has as many as 12 pairs of nerves. The Simaloer specimens tend to have smaller leaves; in other respects the plants from the east and west coasts are sufficiently alike to warrant their being considered to represent a single species. The "stipules" indicated as 2-2.5 cm. long in the original description are merely incipient leaves, and mm. should be substituted for cm.

56. *Microtropis philippinensis* Merr. Philip. Jour. Sci. Bot. 13: 306. 1918; Enum. Philip. Fl. Pl. 2: 482. 1923.

PHILIPPINES: Catanduanes, Mount Mariguison, *Ramos* 30580 (A, M, U) type.

This species is known only from the type collection, which consists of fruiting specimens. *Microtropis rubra* Elmer, erroneously placed by the senior author in 1923 as a synonym, has paniculate-cymose inflorescences, not the dichotomous ones of *M. philippinensis* Merr. and is amply distinct; see p. 305.

#### Series CYMOSO-PANICULATAE

Leaves various, small to large, chartaceous to stiffly coriaceous; inflorescences paniculate-cymose, not strictly dichotomous; i. e., the rachis extended above the first pair of lateral branches, the few branches racemously arranged; disk

present (except in *M. tenuis* and *M. valida*). Malay Peninsula, Borneo, Philippines.

57. *Microtropis tenuis* Symington, Jour. Malay. Br. Roy. As. Soc. 14: 350. t. 19. (1936) 1937.

MALAY PENINSULA: Pahang, Gunong Tapis, Kuantan, *Symington* 28818 (not 28878) (S, photo. A), June 13, 1934, altitude about 600 m., type.

By its very obscure or obsolete disk this might be placed in the group with *Microtropis discolor* Wall. with which, however, it does not otherwise closely conform. It has the characteristic, although much reduced cymose-paniculate inflorescences of the group in which it has been placed rather than strictly dichotomous ones. It is, however, not closely allied to any other species placed in this assemblage. By error in the original description the type number was cited as 28878 *Symington*; it is 28818.

58. *Microtropis valida* Ridl. Jour. Roy. As. Soc. Straits Branch 75: 19. 1917, Fl. Malay Penin. 1: 445. 1922.

MALAY PENINSULA: Perak, Hermitage, alt. about 900 m., *Curtis* 1331 (K, S, photo. A).

A species strongly characterized by its elongated, stout, many-flowered paniculate cymes among those species with coriaceous leaves and 4-merous flowers.

Ridley states "Petals connate below, lobes 4, short, broad, rounded. Stamens 4 inserted on the tube, filaments broad." We note no disk, but the petals are free or nearly so, their bases apparently slightly united by the alternate filaments as in the otherwise unrelated *M. discolor* Wall.

59. *Microtropis kinabaluensis* sp. nov.

Frutex glaber, ramis teretibus, rigidis, ramulis 2-3 mm. diametro, teretibus vel subcompressis, internodiis 2.5-6 cm. longis; foliis plerumque ellipticis vel late oblongo-ellipticis, subcoriaceis, in sicco pallide subolivaceis, subtus paullo pallidioribus, 10-20 cm. longis, 4-9 cm. latis, breviter acuminatis vel subacutis, basi acutis vel paullo decurrentibus; nervis primariis utrinque circiter 10, utrinque subaequaliter leviter elevatis, arcuato-anastomosantibus, secundariis paullo minus distinctis, reticulis ultimis utrinque leviter elevatis, subconfertis; petiolo 1-2.5 cm. longo; inflorescentiis terminalibus et in axillis superiori-



bus, 1-4 cm. longis, cymoso-paniculatis, pedunculatis (pedunculo circiter 1 cm. longo), vel e basi ramosis, ramis primariis paucis racemose dispositis; floribus 5-meris, sessilibus, trinis, bracteis oblongo-ovatis, acutis vel acuminatis, circiter 3 mm. longis, bracteolis similibus, paullo brevioribus; sepalis obovatis, late rotundatis, circiter 3 mm. longis, in sicco pallidis, subreticulato-rugosis, margine membranaceis; petalis subellipticis, sepala aequantibus, rotundatis; filamentis vix 1 mm. longis, disci margini insertis; ovario anguste oblongo-ovoido, obscure sulcato, 2-loculari.

BORNEO: British North Borneo, Mount Kinabalu, Tenompok, 1500 m. alt., *Clemens* 29518, Jan.-June, 1932, without notes (A holotype, B, Ge, L, N, UC).

59a. *Microtropis kinabaluensis* var. *acuminata* var. nov.

A typo differt foliis tenuioribus, angustioribus, perspicue acuminatis, 13-17 cm. longis, 3-6 cm. latis; fructibus ellipsoideis vel subcylindraceis, 12-15 mm. longis, breviter apiculatis, rubris.

BORNEO: British North Borneo, Mount Kinabalu, Gurulau Spur, *Clemens* 10844 (M); Penibukan, *Clemens* 31504 (B, L, N), 40579 (A holotype, L, UC), an undershrub, alt. 4500-5000 ft. Some of these specimens have mature fruits, red when ripe, ellipsoid to somewhat obovoid, about 1.5 cm. long.

It is possible that what we have placed as a variety of *Microtropis kinabaluensis* may ultimately prove to be worthy of specific rank. The material available is somewhat inadequate. It is suspected, however, that the differences indicated may possibly be due to varying habitats. It is varyingly described as a "small tree" and as an undershrub less than 2 feet high. The species is manifestly allied to *Microtropis sterrophylla*, but has much thinner leaves, the primary and secondary nerves and the ultimate reticulations being more or less elevated and distinct on both surfaces.

60. *Microtropis sterrophylla* sp. nov.

Frutex circiter 1 m. altus, glaber, ramis ramulisque teretibus, rigidis, rubro-brunneis, novellis interdum subcompressis, junioribus 3-4 mm. diametro; foliis crassissime coriaceis, rigidis, 12-15 cm. longis, 3-6 cm. latis, lanceolatis vel oblongo-lanceolatis vel subellipticis, utrinque subaequaliter angustatis, basi cuneatis, apice per-

spicue acuminatis, margine revolutis, supra olivaceis vel olivaceo-viridibus, subtus valde pallidioribus subalbicantibus; nervis primariis utrinque 10-12, subtus obscuris; inflorescentiis axillaribus, cymoso-paniculatis circiter 2 cm. longis, plerumque solitariis, ut videtur paucifloris (floribus haud visis), pedunculo 1-1.5 cm. longo; rhachibus supra ramos primarios inferiores productis, ramis primariis paucis, crassis, circiter 7 mm. longis; fructibus immaturis subcylindraceis, circiter 1 cm. longis, apiculatis.

BORNEO: British North Borneo, Mount Kinabalu, Penibukan and Nienkok, *Clemens* 31504 (A, type), 30773, (A, N, B), s. n. (B), on forested slopes 900-1500 m. alt.

A species in the general alliance with *M. kinabaluensis* Merr. & Freem. characterized, however, by its rigid stout branchlets and its very coriaceous, rigid leaves (whence its specific name) which are very pale, often almost white beneath when dry.

61. *Microtropis rubra* Elmer in herb. sp. nov.

Frutex glaber, ramis teretibus, brunneis vel rubro-brunneis, ramulis teretibus leviter compressis vel obscure sulcatis, ultimis, 1.5-2 mm. diametro, internodiis 3-11 cm. longis; foliis chartaceis, ellipticis vel elliptico-ovatis, breviter vel graciliter acute acuminatis, basi late acutis vel decurrenti-acuminatis, 8-14 cm. longis, 4-8 cm. latis, supra pallide olivaceis, subtus pallide brunneis, nervis primariis utrinque 7-8, gracilibus, utrinque leviter elevatis, arcuato-anastomosantibus; petiolo 8-10 mm. longo; inflorescentiis axillaribus, solitariis, paniculato-cymosis, i. e. rhachibus supra ramis primariis distincte productis, 1-2 cm. longis, paucifloris; floribus 5-meris, circiter 2.5 mm. longis, plerumque binis vel trinis in ramulis ultimis dispositis, lateralibus breviter (1 mm.) pedicellatis; bracteis ovatis, acutis vel acuminatis, circiter 1.5 mm. longis, bracteolis similibus, brevioribus; sepalis late ovatis, rotundatis, 2-2.2 mm. longis, margine integris; petalis (immaturis) ellipticis, 2 mm. longis; staminibus 5, margini disci distincti (0.8 mm. alti) insertis; filamentis crassis, brevibus, antheris ovoideo-ellipticis, 0.6 mm. longis; ovario 2-loculari, angusto, cum stylo obscure sulcato 2 mm. longo; fructibus oblongo-ellipsoideis, perspicue rostratis, circiter 2 cm. longis, ad 8 mm. diametro, rostro angusto, plerumque 5 mm. longo.

PHILIPPINES: Luzon, Sorsogon Province, Irosin, Mount Bulusan, *Elmer* 14367 (A holotype, Ge,

Gr, L, N, U, UC), 15669 (A, Ge, Gr, L, N, U, UC), April, 1916, without notes.

This species was distributed by Mr. Elmer under the specific name we have adopted. In 1923 it was cited, *in nota*, by Merrill, Enum. Philip. Fl. Pl. 2: 482. 1923 under *M. philippinensis* Merrill, which had been described from a Catanduanes specimen in 1918. A more critical examination of the material available clearly indicates that two distinct species are represented, *M. philippinensis* Merr. with strictly dichotomous cymes, and *M. rubra* Elmer with paniculate-cymose inflorescences. Both species, however, have relatively large prominently rostrate fruits. They differ further in vegetative characters, *M. philippinensis* Merr. having oblong-elliptic, relatively narrower leaves than *M. rubra* Elm. We suspect that Mr. Elmer selected the specific name either because of the red fruits of his species (no notes available), or because of the sometimes slightly reddish tinge to the pale brown lower surfaces of some of the leaves when dry. In one specimen of *Elmer 14367* examined, the uppermost reduced cyme was dichotomous rather than paniculate-cymose.

62. *Microtropis basilanensis* sp. nov.

Frutex circiter 2 m. altus, glaber; ramulis 1-2 mm. diametro, novellis 4-angulatis, sulcatis, pallide brunneis, internodiis 5-7 cm. longis; foliis chartaceis, vel junioribus submembranaceis, late oblongis vel oblongo-ellipticis, graciliter acuminatis, basi acutis vel leviter decurrentibus, 12-17 cm. longis, 4-7 cm. latis, supra olivaceis vel cinereo-olivaceis, leviter nitidis, subtus pallidioribus, pallide rubro-brunneis; nervis primariis utrinque circiter 10, subtus magis distinctis, reticulis ultimis supra obscuris, subtus distinctis; petiolo gracili, 1-1.5 cm. longo; cymis axillaribus et extra-axillaribus, paniculato-cymosis, circiter 1.5 cm. longis, plerumque solitariis, pedunculo 1 cm. longo, rhachibus supra ramos primarios productis; floribus paucis, 4-meris, immaturis, plerumque sessilibus, in triadibus dispositis, bracteis 2 mm. longis, pallidis, minute erosis; sepalis elliptico-ovalis, rotundatis, circiter 2 mm. longis, pallidis, erosis; petalis immaturis quam sepala brevioribus; staminibus disci margini insertis; ovario ovoideo, sursum angustato, 2-loculari.

PHILIPPINES: Basilan, Mount Basilan, *Miranda 18930* (M, U, photo. A), near small streams in forests at 400 m. alt.

This species in general resembles several other of the large leaved Philippine forms, notably *M. platyphylla* Merr., *M. chartacea* Merr. & Freem., and *M. philippinensis* Merr., differing in its 4-merous flowers and in its vegetative characters.

63. *Microtropis rostrata* Merr. Philip. Jour. Sci. 17: 275. 1920, Enum. Philip. Fl. Pl. 2: 482. 1923.

PHILIPPINES: Luzon, Camarines Province, Paracale, *Ramos & Edaño 33568* (A, L, M, U); Alabat, *Ramos & Edaño 48070* (M, N, UC), 48164 (A, M, N, U, UC).

This resembles *M. fasciculata* Quis. & Merr., but can easily be distinguished from it by its smaller, narrow, acuminate leaves and peduncled cymose-paniculate inflorescences. It also somewhat resembles *M. philippinensis* Merr., but differs in having elongated, sublanceolate leaves, more numerous lateral nerves and more prominently rostrate fruits, as well as in its cymose-paniculate rather than strictly dichotomous inflorescences.

64. *Microtropis platyphylla* Merr. Philip. Jour. Sci. Bot. 10: 319. 1915, Enum. Philip. Fl. Pl. 2: 482. 1923.

PHILIPPINES: Luzon, Rizal Province, Montalban, *Loher 5774* (M, photo. A), 5779 (U, photo. A), 12853 (UC, M), 14251 (M); Balintingan 13882 (A, M); Mount Irig, *Ramos 41898* (A, M, U).

64a. *Microtropis platyphylla* Merr. var. *ellipticifolia* var. nov.

A typo differt foliis minoribus, ellipticis, plerumque 8-14 cm. longis, 4-8 cm. latis.

PHILIPPINES: Luzon, Nueva Ecija Province, Mount Umingan, *Ramos & Edaño 26402* (A type, M, N, U); Tayabas Province, Mount Alzapán, *Ramos & Edaño 45674* (M, UC); Mount Binuang, *Ramos & Edaño 28569* (A, M, UC). A small shrub about 1 m. high in forests.

EXCLUDED SPECIES

MICROTROPIS ? CORIACEA Wall. List no. 4338. 1830, *nomen nudum*; Ettingsh. Denskr. Akad. Wiss. Wien. Math.-Nat. Classe 13: 64. t. 4. f. 12. 1857, descr. fol. = *Salacia flavescens* Kurz.

The Index Kewensis reduction of this species is to *Gynotroches axillaris* Blume, apparently due to a remark made by Arnott, Ann. Nat. Hist. 1: 372. 1838, to the effect that *Microtropis coriacea* Wall.,

of which he had seen no flowers, was probably the same as *Dryopetalum coriaceum* Arn. = *Gynotroches*. This erroneous reduction is repeated in Hook. f. Fl. Brit. Ind. 2: 440. 1878, although three years earlier Lawson, op. cit. 1: 625. 1875, had correctly reduced it to *Salacia flavesceens* Kurz. We are indebted to Mr. Gilmour of the Royal Botanic Gardens, Kew, for a loan of *Wallich* 4338, and to Mr. Airy-Shaw for a critical note on problems of nomenclature involved.

**MICROTROPIS LANCEOLATA** Boerl. & Koord. in Koord.-Schum. Syst. Verzeich. Herb. Koord. 2: 33. 1911 = *Linociera* sp.

This species was based on *Koorders* 10283 ♂, Yzerman Expedition to central Sumatra, a fruiting specimen. Examination of the holotype in the Buitenzorg Herbarium clearly shows that a species of *Linociera* perhaps allied to the Bornean *L. oligantha* Merr. is represented. I have not been able to match the specimen to my satisfaction among the Malaysian species of *Linociera* available to me, nor was Dr. Van Slooten any more successful at Buitenzorg.

**MICROTROPIS LATIFOLIA** Gardn. ex Bedd. Trans. Linn. Soc. 25: 213. 1865, *nomen nudum*.

This is probably the species later described by Gamble as *Microtropis Stocksii* Gamble. Gardner's binomial was based on a specimen from the Anamalai Mountains in India. The other possibility is *Microtropis latifolia* Wight.

#### AMERICAN SPECIES

As noted in the introduction, we have not studied the few American species as these have been considered by Sprague, Kew Bull. 362-364. 1909, and very recently again by Dr. C. L. Lundell. The latter's paper with amplified descriptions of the four species and an analytical key, appears in Contr. Herb. Univ. Michigan 3: 23-35. 1939. The species are merely listed here as Dr. Lundell has disposed of them.

**MICROTROPIS GUATEMALENSIS** Sprague, Kew Bull. 364. 1909. Guatemala.

**MICROTROPIS OCCIDENTALIS** Loesen. Bot. Gaz. 24: 393. 1897. Mexico: Vera Cruz.

**MICROTROPIS SCHIEDEANA** Loesen. Bot. Jahrb. 29: 98. 1901. Mexico: Vera Cruz.

**MICROTROPIS STANDLEYI** Lundell, Bull. Torr. Bot. Club 65: 463. 1938. Costa Rica.

#### EXCLUDED AMERICAN SPECIES

**MICROTROPIS FILIPES** Sprague, Kew Bull. 363. 1909 = *Myginda filipes* (Sprague) Loesen. Notizbl. Bot. Gart. Berlin 13: 226. 1936. Mexico: Tobasco.

**MICROTROPIS PARVIFLORA** Sprague, Kew Bull. 363. 1909, based on *Euonymus parviflorus* Hemsl. Diagn. Pl. Nov. 1: 6. 1878, Biol. Centr.-Am. Bot. 1: 188. 1880 = *Myginda* ? *parviflora* Loesen. Notizbl. Bot. Gart. Berlin 13: 225. 1936 = *Rhacoma parviflora* (Hemsl.) Lundell, Am. Midl. Nat. 20: 238. 1938. Nicaragua.

E  
C

C  
C  
C  
C  
C  
C

C  
C  
D  
L  
E

E

E  
E  
E

F  
F  
G  
G  
G  
H  
J  
J  
J  
L  
M  
M  
M

# INDEX

New names appear in black faced type, synonyms and incidentally mentioned species in italics.

- Bicolores..... 298  
*Cassine discolor* Wall  
 271, 272, 273, 274  
*illicifolia* Hay..... 292  
*japonica* O. Ktz..... 294  
*kotoensis* Hay..... 295  
*Matsudai* Hay..... 292  
*micrantha* Hay..... 291  
*Celastrus bivalvis* Jack 271, 272, 301  
 Chartaceae..... 303  
 Chlorocarpae..... 290  
*Chingithamnaceae*..... 284  
*Chingithamnus* Hand.-Maz.  
 271, 272, 273, 277  
*osmanthoides* Hand.-Maz. 273, 284  
 Confertiflorae..... 302  
 Cymoso-paniculatae..... 304  
 Discolores..... 292  
*Dryopetalum coriaceum* Arn..... 307  
*Elaeodendron Fortunei* Turcz..... 285  
*japonicum* Fr. & Sav..... 272, 294  
*Elaeodendrum* ? *nalghirense*  
 Wall..... 286  
 Ellipticae..... 296  
*Euchlora Ecklon & Zeyer*..... 271  
*Euonymus capillaceus* Wall..... 301  
*filiformis* Wall..... 300  
*Fortunei* Hand.-Maz..... 285  
*garcinifolius* Wall..... 293  
*laeta* Wall..... 300, 301  
*parviflorus* Hemsl..... 307  
 Fallaces..... 296  
 Filiformes..... 300  
 Gageanae..... 298  
*Gordonia* ? *peduncularis* Wall..... 286  
*Gynotroches axillaris* Blume..... 306  
 Hexandrae..... 289  
*Ilex dipygrena* Wall..... 293  
 Japonicae..... 294  
 Javanicae..... 295  
*Linociera oligantha* Merr..... 307  
 Microcarpae..... 286  
*Microtropis* E. Meyer..... 271  
*Microtropis* Wall..... 271, 276  
*basilanensis* Merr. &  
 Freem..... 306  
*Beddomei* Merr. & Freem..... 289  
*bicolor* Merr. & Freem..... 298  
*biflora* Merr. & Freem..... 288  
*bivalvis* (Jack) Wall.  
 271, 272, 300, 301  
*bivalvis*, var. *laeta* (Wall.)  
 Merr. & Freem..... 300, 301  
*bivalvis* sensu Koord..... 295  
*bivalvis* sensu Kurz..... 301  
*canthoides* Hand.-Maz..... 283  
*canthoides* var. *insularis*  
 Merr. & Chun..... 283  
*cathayensis* Merr. & Freem. 285  
*chartacea* Merr. & Freem.  
 303, 306  
*chlorocarpa* Merr. & Freem. 290  
*confertiflora* Merr. &  
 Freem..... 274, 302  
*coriacea* Wall..... 271, 306  
*crassifolia* Craib..... 283  
*Curranii* Merr..... 274, 287  
*Curranii* var. *obovata*  
 Merr. & Freem..... 287  
*Curranii* var. *zambalesensis*  
 Merr. & Freem..... 287  
*densiflora* Wight..... 287  
*discolor* Wall.  
 271, 292, 293, 294, 300, 304  
*discolor* sensu Dunn..... 288  
*elliptica* King..... 296, 303  
*fallax* Pitard..... 296  
*fasciculata* Quis. & Merr.  
 303, 306  
*filiformis* (Wall.) King..... 300  
*filiformis* var. *grandiflora*  
 Merr. & Freem..... 300  
*filiformis* sensu Fischer..... 300  
*filipes* Sprague..... 307  
*fokienensis* Dunn..... 273, 292  
*fokienensis* var. *longipedun-*  
*culata* Cheng..... 288  
*fokienensis* sensu Merr. &  
 Chun..... 291  
*Gagei* Merr. & Freem..... 298  
*garcinifolia* Wight..... 293  
*gracilipes* Merr. & Mete. 274, 302  
*gracilipes* var. *parvifolia*  
 Merr. & Mete..... 302  
*guatemalensis* Sprague..... 307  
*Henryi* Merr. & Freem..... 289  
*hexandra* Merr. & Freem.  
 274, 289  
*illicifolia* Koidz..... 292  
*illicifolia* var. *yunnanensis* Hu 292  
*japonica* (Fr. & Sav.) Hall. f. 294  
*japonica* sensu Merr..... 285  
*javanica* Merr. & Freem..... 295  
*kinabaluensis* Merr. &  
 Freem..... 304  
*kinabaluensis* var. *acumi-*  
*nata* Merr. & Freem..... 305  
*kotoensis* Koidz..... 295  
*lanceolata* Boerl. & Koord... 307  
*liukuensis* Koidz..... 295  
*latifolia* Gardn..... 307  
*latifolia* Wight..... 273, 284, 307  
*latifolia* sensu Dunn..... 284  
*latifolia* sensu Cooke..... 283  
*longifolia* Wall..... 271, 299  
*longirostris* Merr. & Freem. 303  
*macrophylla* Merr. &  
 Freem..... 299  
*Matsudai* Koidz..... 292  
*micrantha* (Hay.) Koidz..... 292  
*microcarpa* Wight..... 286  
*microcarpa* var. *densiflora*  
 (Wight) Merr. & Freem..... 287  
*obliquinervia* Merr. &  
 Freem..... 286  
*obscurinervia* Merr. &  
 Freem..... 283  
*occidentalis* Loesen..... 307  
*oligantha* Merr. & Freem..... 288  
*ophirensis* Ridl..... 297  
*osmanthoides* Hand.-Maz.  
 273, 284  
*ovalifolia* Wight..... 286  
*ovata* Merr. & Freem..... 297  
*pachyphylla* Merr. &  
 Freem..... 298  
*pallens* Pierre..... 274, 294  
*pallens* sensu Craib..... 293  
*parviflora* Sprague..... 307  
*pauciflora* Boerl..... 303  
*paucinervia* Merr. & Chun. 285  
*peduncularis* Ridl..... 300  
*Petelotii* Merr. & Freem..... 291  
*philippinensis* Merr. 303, 304, 306  
*platyphylla* Merr..... 306  
*platyphylla* var. *ellipticifolia*  
 Merr. & Freem..... 306  
*ramiflora* Wight..... 281  
*ramiflora* sensu Stapf..... 282  
*ramiflora* sensu Thwaites..... 282  
*rigida* Ridl..... 297  
*rostrata* Merr..... 303, 306  
*rubra* Elm..... 304, 305  
*Sakaguchiana* Koidz..... 274, 295  
*Schiedeana* Loesen..... 307  
*Scottii* Parkins..... 274, 301  
*sessiliflora* Merr. & Freem.. 284  
*Standleyi* Lundell..... 307  
*sterophylla* Merr. & Freem. 305  
*Stocksii* Gamble..... 283, 307  
*submembranacea* Merr. &  
 Freem..... 274, 291



<b>suborbiculata</b> Merr. & Freem.....	273, 282	<i>Myrsine Chaffonjoni</i> Lév.....	292	<i>ramiflorus</i> F. N. Will.....	282
<i>sumatrana</i> Merr.....	304	<i>Oliganthae</i> .....	288	<i>Wallichianus</i> F. N. Will.....	283
<i>tenuis</i> Symingt.....	274, 304	<i>Otherodendron</i> Makino.....	271, 272, 277	<i>Paucinervae</i> .....	285
<b>tetragona</b> Merr. & Freem....	290	<i>japonicum</i> Makino.....	294	<i>Pleurostylija pallens</i> Pierre.....	294
<b>triflora</b> Merr. & Freem.....	288	<i>liukiense</i> Nakai.....	295	<i>Ramiflorae</i> .....	281
<i>valida</i> Ridl.....	274, 304	<i>Matsudai</i> Hay.....	292	<i>Reticulatae</i> .....	285
<i>vinculans</i> Boerl. & Koord....	296	<i>Pachyphyllae</i> .....	298	<i>Rhacoma parviflora</i> Lundell...	307
<i>Wallichiana</i> Wight.....	283	<i>Paracelastrus</i> Miq.....	271, 272, 277	<i>Salacia flavescens</i> Kurz.	271, 299, 306, 307
<b>zeylanica</b> Merr. & Freem....	282	<i>bivalvis</i> Miq.....	301	<i>macrophylla</i> Wall.....	299
<i>Myginda filipes</i> Loesen.....	307	<i>densiflorus</i> F. N. Will.....	287	<i>Scottianae</i> .....	301
<i>parviflora</i> Loesen.....	307	<i>microcarpus</i> F. N. Will.....	286		
		<i>ovalifolius</i> F. N. Will.....	286		

